FACTORS AFFECTING RETURN TO WORK FOLLOWING MUSCULOSKELETAL INJURIES IN INCOME DISABILITY INSURANCE CLAIMANTS

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A dissertation submitted to the Faculty of Health Science, University of the Witwatersrand, in fulfilment of the requirements for the degree of Master of Science

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DECLARATION

I, Leeat Blatt, declare that this dissertation is my own work. It is being submitted for the degree of Master of Science in Medicine in the field of Sports and Exercise Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Leeat Blatt

The 23rd day of MARCH, 2016

ORAL PRESENTATIONS ARISING FROM THIS STUDY

1. Blatt, L. (June 2014). Musculoskeletal System - Back Injuries. Association for Savings and Investment South Africa (ASISA) Claims Assessor Course. Johannesburg: verbal presentation.

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ABSTRACT

Introduction: Absenteeism related to disability is a financial burden on society and insurance companies. Many of the factors affecting return to work have not been explored sufficiently in South Africa. Therefore, the aim of this study was to describe the prevalence of musculoskeletal injuries, and the factors that predicted a return to work in insurance claimants.

Methods: A retrospective chart audit of one of the largest insurance companies in the Republic of South Africa was performed. Claims that were paid between 01 January 2011 and 31 December 2014 were analysed. Factors associated with return to work was analysed using a multivariate Cox proportional hazard regression model.

Results: The most common musculoskeletal claims were for conditions and injuries of the lumbar region (29.0%). Waiting periods of one and three months (HR 0.46; 95% CI 0.32 - 0.66 and HR 0.12; 95% CI 0.05 - 0.24; $p<0.01$) respectively and lower education (HR 0.64; 95% CI 0.45 - 0.91; $p=0.01$) were associated with a delayed return to work and monthly income of R5 000 to R10 000 (HR 3.26; 95% CI 2.00 - 5.32; $p<0.01$) was associated with a faster return to work.

Conclusion: In conclusion, lumbar injuries were prevalent in this group of claimants and this research showed that policies with longer waiting periods, and lower education level cause relatively longer delays in return to work. Therefore, insurance companies should intervene sooner in at risk individuals. Further research is required to explore how return to work is affected by insurance and claims handling procedures.

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LIST OF ABBREVIATIONS

AFOEM	- Australasian Faculty of Occupational and Environmental Medicine
AMA	- American Medical Association
ASISA	- Association for Savings and Investment South Africa
BASA	- Biokinetic Association of South Africa
BMI	- Body Mass Index
CI	- Confidence Interval
EU	- European Union
FCE	- Functional Capacity Evaluation
GRID	- Group Risk Development
HR	- Hazard Ratios
HREC	- Human Research Ethics Committee
KM	- Kaplan-Meier
LISV	- The Netherlands National Institute for Social Insurance
MSK	- Musculoskeletal
MVA	- Motor Vehicle Accident
PH	- Proportional Hazard
RACP	- The Royal Australasian College of Physicians
RGA	- Reinsurance Group of America, Incorporated
RTW	- Return to Work
SD	- Standard Deviation
WAI	- Work Ability Index
WHO	- World Health Organization

LIST OF DEFINITIONS

Acute pain	:	Pain was acute when it was present for a maximum of three months (Saastamoinen et al., 2005).
Chronic pain	:	"Chronic pain is often defined as any pain lasting more than 12 weeks" (NIH Medicine Plus, 2011).
Disabilities	:	"Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions" (World Health Organization, 2015).
Full return to work	:	Returning to work and achieving full-time hours with normal duties (Cornell University, 2009).
Functional capacity evaluation (FCE)	:	"FCE's are standardised batteries of tests which all together form an evaluation of capacity of work-related activities. FCE's are used in occupational, insurance, and rehabilitation medicine in order to evaluate work ability" (Soer et al., 2008).
Musculoskeletal	:	"Relating to or involving the muscles and the skeleton" (The Free Dictionary by Farlex, 2015).
Physical	:	"Of or relating to the body" (The Free Dictionary by Farlex, 2015).
Work status	:	Positions of full-time work, part-time work or an individual who is not working (Cornell University, 2009).

CHAPTER 1

1. INTRODUCTION

1.1. BACKGROUND

It is essential for long term insurance companies to ensure a quick and efficient return to work (RTW) of claimants; yet some of the factors that affect RTW are not completely understood (Johnson and Fry, 2002). It is therefore important to understand the factors that affect RTW in order to promote wellness and safe RTW.

In South Africa, insurance companies are focusing on RTW to a greater extent, especially in light of the tax changes that have taken place and became effective from 1 March 2015. According to Musviba (2014), the South African Tax Guide reported that the changes on income protection policies are such that premiums will no longer be tax deductible and the actual income benefits will be paid out tax free. This decreases the incentive for claimants already being paid to RTW because they are receiving more money for staying off work. Factors influencing RTW following musculoskeletal (MSK) conditions in income disability insurance claimants is therefore a currently relevant topic.

According to Woolf and Pfleger, (2003) MSK conditions are a major burden to society. This is confirmed by Dachs et al., (2014) who reported that 2.5% - 7.7% of many countries' gross national product is spent on MSK conditions. Individuals, social care and health care systems are all affected by these conditions. The indirect costs of MSK conditions are predominant and these conditions commonly cause long term absenteeism from work (Woolf and Pfleger, 2003). Indirect costs are endured by both the employer and the employee. In the United States, workers' compensation costs were estimated at approximately 60 billion dollars in 1992 and this represented around 40.0% of the total illness and occupational injury costs in the United States at that time (Krause et al., 2001). A more recent study estimated the costs to be 192 billion dollars annually (Sears et al., 2013).

The impact of work disability which includes all benefit payments, medical and legal costs, only represents a small amount of the total financial burden of occupational injury

and disease. Furthermore, the effect of the conditions on both individuals and society are anticipated to rise going forward (Woolf and Pfleger, 2003).

Failure to RTW due to MSK conditions is therefore of great concern. The financial implications of long term and/or permanent claims for income disability are high. Insurers receive substantial information in order to validate a claim which includes medical information from doctors as well as sick leave certificates; however, in many cases, further medical and functional information including the claimant's work ability and ability to perform activities of daily living are necessary to establish if the claim is valid or not, and for how long the claim should be paid. The cost of this extra information is substantial (Spavins, 2011).

The insurer's final decision to accept or reject a claimant's claim is a legal one. It is based on objective medical evidence, objective functional evidence as well as the relevant insurer's policy definition of disability in relation to the claimant's occupation.

Krause et al., (2001) identified approximately 100 different factors affecting RTW outcomes. Many factors are included under the umbrella of individual level worker characteristics. These include:

- Injury descriptors
- Medical and vocational rehabilitation interventions
- Individual task level physical and psychosocial job characteristics
- Employer factors at organisational level
- Employer or insurer based disability prevention and disability management interventions
- Social policy at societal level
- Legislative and macro-economic factors

According to Ruseckaite and Collie (2011), individuals working in manufacturing that need to physically exert themselves and perform manual activity are at higher risk of claiming compensation. This was also evident in the study by Johnson and Fry (2002) in that these individuals often work with potentially dangerous equipment and claim compensation more regularly. Therefore, individuals working in manufacturing may have

longer delays in RTW after sustaining MSK conditions. In light of these risk factors, education regarding secondary prevention may assist in improving long term RTW outcomes (Berecki-Gisolf et al., 2012).

Furthermore, injury recurrence is common and has significant social and economic consequences (Wasiak et al., 2004). Research in other countries has shown that interventions and injury management programmes can play a role in reducing absenteeism, and overall costs (Bunn et al., 2006). In developing countries, MSK conditions appear to be on the increase due to ageing populations and the increase in obesity (Hoy et al., 2014). Internationally, a quarter of visits to a primary care physician or accident and emergency department is as a result of MSK symptoms (Dachs et al., 2014). Research of MSK conditions, specifically within the insurance setting, is prevalent in many countries of the world; however, it is scarce in South Africa (Ajidahun and Phillips, 2013).

Some factors have more significance than others when considering RTW, and have therefore become useful as a performance measure in the insurance environment. Time off work and the age of the claimant are two crucial factors to consider. According to Reinsurance Group of America, Incorporated (RGA) Global Surveys (2012), this is relevant to the South African insurance market because utilisation of rehabilitation as an intervention in individual and group insurance claims departments was low when compared to other countries.

Once the factors influencing RTW are established, insurers will be better equipped to develop interventions that focus on the prevention, treatment and management of the modifiable factors. This will result in more claimants RTW within the shortest possible time and will prevent recurrence of absenteeism again in future (Bunn et al., 2006). This will reduce the duration of claims and improve the insurance costs associated with income disability claims (Johnson and Fry, 2002) and promote wellness and productivity.

1.2. PROBLEM STATEMENT

Much of the research regarding factors that affect RTW, has been undertaken in Europe or the United States (MacKenzie et al., 1998). Although this study involves a topic of interest, the researcher has not encountered any published studies of this nature that

have been undertaken in the Republic of South Africa. Therefore, research of this nature in the South African environment is highly beneficial and warranted. Assessing the determinants of RTW in this unique population may assist in developing specific intervention programmes that aim to facilitate a safe RTW and a reduction in costs associated to this. Therefore, this study explores the factors affecting RTW by analysing the various databases at an insurance company that contains information regarding retrospective income compensation claims for the years 2011 to 2014.

Musculoskeletal conditions are prevalent in people and often result in costly insurance claims. Some of these claimants are able to RTW while others never RTW, and factors influencing RTW remains largely unsolved in South Africa. Little is known about the prevalence of conditions and the factors that play a role in RTW in South Africa. Therefore, it is necessary to formulate guidelines to assist insurance claimants with the earliest possible RTW to reduce the length of claims as well as prevent claims arising in the future.

1.3. **OVERALL AIM:**

To assess factors affecting RTW following MSK injuries in income disability insurance claimants.

1.4. **THE OBJECTIVES OF THIS STUDY ARE:**

1. To assess the prevalence of various MSK conditions, according to anatomical region in claimants claiming under their income disability benefits
2. To determine the risk factors associated in predicting RTW
3. To propose practice and policy guidelines and recommendations for the benefit of insurance companies, based on evidence-based research and the findings of the current study

CHAPTER 2

2. LITERATURE REVIEW

2.1 INTRODUCTION

This literature review will begin with the prevalence of MSK conditions and end with disability prevention. Other topics covered include burden of disability claims, types of injuries, risk factors, work disability insurance, outcomes, rehabilitation and RTW, claims assessment and case management.

2.2 PREVALENCE OF MUSCULOSKELETAL CONDITIONS

Musculoskeletal conditions are the most common cause of short-term and long-term workplace disability; however, MSK pain is a natural part of everyone's life (Melhorn, Lazarovic and Roehl, 2005, p.7). Musculoskeletal conditions are not only caused by work (Punnett and Wegman, 2004), and they occur in all types of occupations and industries (Das and Ghosh, 2010). Musculoskeletal trauma makes up a large portion of the global disease burden and it continues to rise (Beveridge and Howard, 2004). In an occupational setting, MSK conditions tend to occur progressively over a period of time with exposure to various causal factors (Das and Ghosh, 2010). Chronic medical conditions are the most common problems that result in early retirement. This includes chronic conditions, such as MSK conditions, which make up almost two-thirds of disability retirements (Noone, 2012). Bakker et al., (2006) reported that a large amount of disability claims are as a result of undiagnosed conditions, predominantly of the MSK and mental/nervous system.

Musculoskeletal conditions influence all aspects of life as a result of pain and by reducing an individual's ability to perform activities of daily living (Woolf, Erwin and March, 2012). Individuals with MSK conditions display different degrees of disability, reduced quality of life, physical and psychological distress (Rudy et al., 2003).

Disability arises due to a person's inability to successfully complete a task due to impairment in various areas of functional capability. Functional capability encompasses mental function, physical function, agility, coordination, dexterity, endurance, experience, knowledge, intellectual ability, skill and strength. A medical condition or impairment may

contribute or cause disability; however, disability is not necessarily associated with any specific health impairment or medical condition as an individual may be disabled without a definitive diagnosis (Melhorn, 2001).

Prevalence of some of these conditions rises to some degree in respect of age and they can also be affected by lifestyle factors such as smoking and nutrition. Musculoskeletal conditions cause more functional limitations in adults than any other illnesses (Woolf and Pfleger, 2003). Interestingly, an association has been found between smoking and regional pain (Palmer et al., 2003). The pain and physical disability also affects social functioning and mental health which further reduces quality of life (Woolf and Pfleger, 2003). This is despite progress in the prevention of MSK conditions (Arnetz et al., 2003). Individuals display a lack of awareness of the potential of sustaining MSK conditions, they regard pain as normal and they often blame themselves for the onset of MSK conditions (Hunter and Silverstein, 2014). Much research has however been undertaken on the prevention of MSK conditions and more employers are providing occupational health services to employees (Hagberg et al., 2012).

When measuring the burden of diseases, diseases are classified according to the amount of death and disability they cause. Disability-adjusted life years is the total measure of the wellness of the population that the global burden of diseases uses. It combines years of life lost to premature mortality and years individuals lived with disability (Vassilaki and Hurwitz, 2014). Musculoskeletal conditions have resulted in the loss of more than 45 000 disability-adjusted life years in South Africa (Dachs et al., 2014). A Ugandan study found that for every individual that dies from trauma, 3 to 8 more individuals are permanently disabled due to injury (Dachs et al., 2014). Disability affects all work tasks and occupations.

The prevalence of MSK conditions that are work related is found in all types of occupations. Das and Ghosh (2010) found that the prevalence of MSK conditions among keyboard users was 81.0%. The European Agency for Safety and Health at Work found that MSK conditions are most prevalent among service workers, shop and market sales employees (Sirge et al., 2014). Puckree (2009) reported that MSK pain is considerably prevalent in hairdressers in Durban.

A 2007 international study which included South Africa showed that 26.3% of South Africans in the study reported experiencing chronic neck or back pain in the preceding year (Demyttenaere et al., 2007). This was found to be the third highest in the world (Demyttenaere et al., 2007). The prevalence of low back pain is 25.0% to 30.0% in an adult lifecycle and it has an incidence of approximately 5.0% per year (Quittan, 2002). In South Africa, the prevalence of a case of major depression in individuals with chronic neck or back pain was observed to be 8.4% within 12 months after the onset of chronic pain. The above literature confirms that MSK conditions are prevalent and back problems are the most common conditions causing significant direct and indirect costs.

2.3 BURDEN OF DISABILITY CLAIMS

Work absences related to disability costs organisations billions of dollars annually. Absenteeism as a result of unplanned incidents like accidents or disability claims can be as much as 3.0% to 6.0% on a usual day (Bunn et al., 2006). In the United States, it is estimated that more than 215 billion dollars is spent annually on MSK care (Karpman, 2001) and workers' compensation costs were estimated at 50 billion dollars (Young et al., 2005). The amount of working-age Americans receiving insurance disability benefits increased to as high as 4.6% in 2013. As a result, the federal Disability Insurance Trust Fund is expected to be exhausted by 2016 and therefore action needs to be taken in the form of research and practices need to be put in place to manage this (Liebman, 2015). This approach appears to be reactive rather than proactive as the duration of the cover is limited until the fund runs out.

In the European Union (EU), it is reported that MSK conditions make up 40.0% of workers' compensation costs (Roh, Lee and Kim, 2014). Among all EU member states, MSK conditions are the main reason for work disability, work absenteeism and reduction of productivity. The cost of lost productivity may be as high as 2.0% of gross domestic product (Bevan, 2015). Ruseckaite and Collie (2011), found that the majority of the 107 388 single claims in their study that used data from Victoria, Australia were as a result of MSK conditions.

Musculoskeletal disability is reported less in low-income and lower middle-income countries when compared to upper middle-income and high-income countries (Hosseinpoor et al., 2013). Incorporating equity components into monitoring disability

within countries may assist in more interventions reaching the populations that need it most (Hosseinpoor et al., 2013). Studies of South Africa involving the cost and burden of MSK conditions are lacking.

2.4 TYPES OF INJURIES

2.4.1 Musculoskeletal Conditions

Musculoskeletal pain may often occur at multiple locations simultaneously and has been found to be a significant threat to work ability, particularly in older individuals (Miranda et al., 2010). According to Woolf and Pfleger (2003), MSK conditions are prevalent and encompass a wide range of conditions. Arnetz et al., (2003) report that MSK conditions including neck, shoulder, and upper and lower back symptoms are very common.

2.4.2 Upper Limb

Workers exposed to tasks that require repetition, precision and undesirable postures are at risk of upper limb MSK conditions (Sundstrup et al., 2014). Incorrect MSK load in the work place may also lead to MSK conditions (Roman-Liu, 2014). The increase of computer use in office workers can be attributed to the rise of work-related upper extremity MSK conditions (Esmaeilzadeh, Ozcan and Capan, 2014).

Individuals with MSK conditions involving the shoulder often seek healthcare. Shoulder pain and functionality poses a problem as it can take a long time to recover. Individuals presenting with unilateral shoulder pain have variable patterns of peripheral and central sensitisation (Coronado et al., 2014). The hands, arms, neck and associated structures may also be affected by upper limb MSK conditions (Bhattacharya, Biswas and Battacharya, 2013).

2.4.3 Lower Back

Back pain in particular has increased and in North America is one of the five most frequent reasons to visit the doctor (Dionne et al., 2005). Low back pain is a prominent cause of work disability (Rantonen et al., 2016; Ryan et al., 2014; Krause et al., 1999). Ruseckaite and Collie (2011) found that recurring back injuries that led to claims for compensation occurred at an increased rate of 80.0% when compared to initial injuries among carpenters, with the mechanism and nature of the injury being very similar in both cases.

Disability as a result of low back pain in western countries has progressively increased over the last few decades. The great social and financial cost of low back pain is as a result of the minority of individuals who are absent from work for longer than six months (Valat, Goupille and Vedere, 1997). Occupational low back pain is the most costly form of work disability. The socioeconomic costs of persistent low back pain largely exceed the costs of acute and sub-acute low back pain (Melloh et al., 2013). Back injuries that are disabling are linked with decreased earning ability and reduced quality of life (Krause et al., 1999). Return to work post occupational injuries and work disability duration as a consequence of low back pain have become key concerns in many industrialised countries (Stephenson, 2016; Krause et al., 1999).

In working–age adults with low back pain, a primary goal in terms of the physical therapy intervention is to assist individuals to feel capable to continue and/or resume their normal job-related activities (Shaw, Main and Johnston, 2011). The assumption that sending a claimant for a Functional Capacity Evaluation (FCE) is that those individuals who perform well in the assessment such that they meet or exceed their physical job requirements are expected to RTW sooner. They also have less risk of re-injury or flare-ups of pain as they meet the spinal loading demands of their job (Gross and Battie, 2005). However, Gross, Battie and Cassidy (2004) found that improved performance on FCE was weakly associated with quicker recovery. Although there is the possibility that low back pain is related to a serious spinal pathology, a nerve root problem or a non-specific low back pain (Ryan et al., 2014), there is not always a direct link between pain, impairments and disability in chronic lower back pain (Vlaeyen et al., 1995). According to Riihimaki (2014, p.2192), a significant portion of the societal burden due to back problems is as a result of non-specific back pain.

2.5 RISK FACTORS

Risk factors associated with other causes of disability are very similar when compared to risk factors associated with specifically MSK disability (Badley and Ibanez, 1994). As the duration of work disability increases, it becomes less likely that the injured individual will ever RTW. The minority of employees with long-term disabilities make up the bulk of workers' compensation costs (Oyeflaten et al., 2016; Krause, Dasinger and Neuhauser, 1998).

Although the source of a disability is an injury or a disease, factors such as educational achievement and the state of the labour market also have an impact on the extent of disability (Thomason, Burton and Hyatt, 1998). Injury is highly recognised as a great contributor to work disability. Mackenzie et al., 1998 found that although the recovery rate in their study was high, there was a weak correlation between physical impairment and the rate of RTW. This implies that other factors exist which explain the key differences in the extent and rate of RTW (MacKenzie et al., 1998).

2.5.1 **Gender**

Clinicians have hypothesised that gender may be a risk factor in treatment outcomes of claimants with chronic disability due to MSK conditions (McGeary et al., 2003). In one study, male gender was found to be a risk factor for chronic pain (Valat, Goupille and Vedere, 1997). On the other hand, it has been shown that women have greater rates of absence due to illness and disability pensions due to MSK conditions (Miranda et al., 2010). Das and Ghosh (2010) found that female visual display terminal workers experience greater discomfort than their male counterparts. Roh, Lee and Kim (2014) reported that women have a high occurrence rate of MSK conditions, especially as they get older. This is confirmed by Palazzo et al., (2014) and may suggest the need for different MSK condition prevention strategies among men and women. According to Treaster and Burr (2004), there is an increased prevalence of upper limb MSK conditions among women. Therefore, it appears from this literature that men are more prone to chronic pain whilst women are generally more at risk of acquiring MSK conditions.

2.5.2 **Socioeconomic Status**

Work disability also appears to be unequally dispersed among socioeconomic groups. For example, manual labourers are more susceptible to early retirement and disability (Noone, 2012). In addition, lower education/income and blue collar occupations have been found to prolong occupational disability (Hamer et al., 2013). These individuals are at the highest risk of experiencing disabling chronic pain and absence from work, and is particularly very common in older females (Saastamoinen et al., 2005).

2.5.3 **Educational Factors**

Following a low socioeconomic status, lower levels of education have also been associated with increased work absence and disability (Hamer et al., 2013; Bakker et al., 2006). Claimants with minimal education are also known to have an increased risk of long term absence from work and disability (Eshoj, Jepsen and Nielsen, 2001).

2.5.4 **Age**

Research indicates that a twenty year old worker has a 3-in-10 chance of becoming disabled prior to retirement age (Melhorn, Lazarovic and Roehl, 2005, p.7). A study by Noone (2012), assessing chronological age, functional age and work outcomes, found that workers with higher chronological ages experienced increased problems relating to age. They also received less assistance in the workplace and they required more support to continue work when compared with younger workers. Furthermore, their work ability scores which indicate the ability to perform work decreased with age (Noone, 2012). Most of the effects of pain experienced in different parts of the human body, in terms of poor physical work ability, have been found to occur among older workers above the age of fifty years (Miranda et al., 2010). Therefore, advanced age is associated with an increased risk of MSK conditions as well as chronic pain (Valat, Goupille and Vedere, 1997).

2.5.5 **Psychological Factors**

Psychological factors are significant predictors of disability outcomes and the most important prognostic data is shown in individual-level perceptions and attitudes about work. In the initial stages of low back pain, individuals may express a number of concerns about RTW that fall outside their job description. Psychosocial factors that involve individuals' outlooks of the workplace are significant predictors of disability outcomes (Shaw, Main and Johnston, 2011). Claimants' perceptions about RTW may therefore be a significant limitation for recovery (Marhold, Linton and Melin, 2002). Mental health status, specifically concerning self-efficacy and the claimant's self-perceived prognosis has constantly proved to be a strong predictor for RTW.

Symptoms of depression have also been found to predict future MSK conditions (Leino and Magni, 1993). According to RGA Global Surveys (2012), claimant motivation was a significant factor in determining RTW success and White et al., (2013) found that there is

strong evidence to show that psychological demands are an important factor to consider when looking at work disability. According to Spavins (2011), physical and psychological factors affect work status in individuals with chronic back pain.

McCluskey et al., (2014) found that significant others have similar unrealistic expectations of treatment when compared to the expectations reported by individuals with persevering low back pain. This could further reinforce illness perceptions and psychosocial barriers to recovery and continued work participation. Schiphorst-Preuper et al., (2008) suggest that for individuals with chronic lower back pain, a strong relationship between psychological factors and disability is evident.

2.5.6 **Work-Related Factors**

Strong evidence also shows that lack of workers' job control is considered to be a limited predictor for occupational disability; however, there is strong evidence to show that job strain, low job satisfaction, increased physical job demands and lack of supervisory support are factors to consider as a predictor for work disability (White et al., 2013; Shaw, Main and Johnston, 2011). White et al., (2013) found that there is moderate evidence that non full-time work can contribute to work disability for workers with rheumatoid arthritis. Moderate evidence also supports that poor leadership quality and lack of workplace fairness (perceived injustice) could contribute to work disability. There is weak evidence to confirm that increased absenteeism tolerance, reorganisational stress, lack of managerial involvement, and delays in obtaining treatment, should be considered as predictors for occupational disability (White et al., 2013; Shaw, Main and Johnston, 2011).

There is evidence to suggest that occupational factors have an effect on the extent of sickness absence after an episode of low back pain. Return to work barriers include heavy physical demands, lack of ability to change job tasks, work stress, inadvertent organisational support, job dissatisfaction, low expectations for resuming normal work and fear of re-injury (Shaw, Main and Johnston, 2011). A worker's self-perceived ability to perform their physical job has been found to be a better predictor of long-term disability when compared to instrumented measurements of job demands (Shaw, Main and Johnston, 2011). Fear of movement and physical activity is often incorrectly thought to cause re-injury (Ulug et al., 2016; Vlaeyen et al., 1995).

Repetitive stress placed on any particular part of the human body as well as incorrect ergonomics usually results in pain and dysfunction (Puckree, 2009). Individuals that are required to maintain static muscle load for prolonged periods and workstation factors are also risk factors for MSK conditions (Das and Ghosh, 2010). Discomfort and pain in the MSK system can be caused by performing work in the sitting position (Sirge et al., 2014) which includes repetitive tasks like driving and sitting at a desk for prolonged periods of time.

Paquette (2008) found that approximately 60.0% of workers with chronic low back pain that were discharged from medical care and returned to work, suffered further work disability. This may be because not all individuals who RTW are fully recovered from their MSK condition (Bultmann et al., 2009). The problem with this scenario is that the economic burden of injury recurrence is often greater than the initial injury (Paquette, 2008). Claimants who sustain injuries and then RTW often experience further work absences as a result of the injury. The frequency of these episodes is important to consider with regards to a sustained RTW (Johnson and Fry, 2002). Previous claims history is therefore important to consider as an indication of the likelihood of temporary or permanent disability of the individual in the future.

It has been found that individuals who struggle to perform personal care tasks and daily activities, is more of a predictor of unemployment than any specific diagnosis, as functional capacity and work ability can be deduced from this (Smith, 2007). There is strong evidence to suggest that the absence of social support in the workplace may contribute to occupational disability (White et al., 2013; Collins, Janse Van Rensburg and Patricios, 2011).

2.5.7 **Waiting Period on Insurance Policy**

Johnson and Fry (2002) have shown that half of the claimants who are off work for one week because of low back pain will have made a RTW at six weeks (Johnson and Fry, 2002). Insurers try and prevent claimants from claiming for minor health problems by imposing waiting periods on policies (Bakker et al., 2006). Therefore, the shorter the waiting period on the policy, the more likely it is that a claim will be paid by the insurer.

2.5.8 Disability Payment Amount

Individuals with policies containing inflated monetary values is a concern as this may assist in motivating the claimant's disability, especially in times of recession. This is important to consider amongst self-employed individuals where secondary gain may be evident (Bakker et al., 2006). This is confirmed by Parsons (2014) who explains that if the value of the unemployment and benefits is greater than that of working, then incentive to find work and take up other job offers is improbable.

2.5.9 Work Duties and Occupations

Sectors at high risk of sustaining MSK conditions include nursing facilities, air transportation, mining, food processing, leather tanning and heavy and light manufacturing (Punnett and Wegman, 2004). Musculoskeletal conditions involving the upper extremity are also prevalent in occupations involving high-intensive manual labour. Conditions involving the back and lower limb also occur excessively among manual labourers (Punnett and Wegman, 2004). Individuals in sedentary occupations are at risk of MSK conditions due to prolonged computer use and poor workstation posture (Das and Ghosh, 2010).

2.6 WORK DISABILITY INSURANCE

A disproportional percentage of the costs of workers' compensation claims are made up of MSK conditions, for example, low back conditions make up 15.0% to 25.0% of all claims but contribute to as much as 40.0% of the costs (Arnetz et al., 2003). Due to the possible impact of workplace absence and lengthy disability duration, it is essential to understand the workplace factors that are modifiable and that may result in preventable work absence and prolonged disability (White et al., 2013).

In the United States, private insurance companies play a critical role in many facets of the workers' disability system. Insurers are the chief financial intermediaries between employers and workers in the workers' compensation programme, in employer-sponsored disability insurance and health insurance (Thomason, Burton and Hyatt, 1998). Impairment is not the only determinant of long-term work disability, but also as a result of interactions between the worker, the health care system, the work environment and the financial compensation systems. Return to work is therefore influenced by an intricate set of interconnected factors that should be taken into consideration if any

intervention is to be provided (Briand et al., 2007). Return to work is however not always easy to achieve. It must be considered a process and not just an event (Young et al., 2005).

Musculoskeletal conditions resulting in long-term sick leave have significant social and economic consequences for workers, their families, their employers and society. Work disability is therefore a multifactorial problem where biological, psychological and social factors need to be taken into account. Workers may be ostracised in the workplace and the risk of future disability pension exists (Bultmann et al., 2009). Workplace interventions have been effective in reducing sickness absence, but have shown no effect on improving health outcomes. The intervention needs to address personal characteristics, health and work-related factors using the biopsychosocial model (Jensen, 2013). This model provides a basis to explain why an individual's behaviours and clinical presentations may relate to non-medical factors. According to this model, the functioning of individuals is influenced by biological, psychological and social factors (Schiphorst et al., 2008). It is therefore important to address chronic work disability from a multidimensional perspective (Laisne, Lecomte and Corbiere, 2013; Wasiak et al., 2004).

Work disability represents the loss of earning capability or the actual loss of income (Thomason, Burton and Hyatt, 1998). Disability is difficult to define and the nature of some insurance products may allow for the early retirement of workers who are not truly disabled (Gruber, 1996). Different entities have varying definitions of disability and there is no generally accepted or standard definition. In reality, the definition of disability is much wider. Insurers may look at pre-injury versus post-injury earnings, or the American Medical Association (AMA) impairment guidelines sixth edition may be used (Rondinelli, 2009). The challenge is that these definitions do not take into account the claimant's social environment or the demands made on the claimant (Krause et al., 2001). The determination of who is disabled poses an ongoing challenge. The use of independent medical evaluations is therefore rife in an insurance setting (Melhorn, 2001). Functional capacity evaluations are also used in order to determine how ready an individual is to RTW by measuring functional abilities in accordance with job demands as well as cognitive and psychological status (Gross and Battie, 2005).

Many insurance companies publish reports on the details of approved claims, RTW outcomes and customer satisfaction. Factors that seem to increase the chance of an insurance claim for temporary or permanent disability being approved include male gender, younger age and lack of work experience (Ruseckaite and Collie, 2011).

2.7 OUTCOMES, REHABILITATION AND RETURN TO WORK

Most individuals are able to make a safe and maintainable RTW with the help of education and exercise. However, for some individuals, RTW becomes a multifactorial problem which requires a great amount of communication and cooperation between the worker, the employer, the insurer and the health care provider (Shaw, Main and Johnston, 2011). Social and disease characteristics can assist in the identification of individuals with MSK conditions accepted for vocational rehabilitation services (Straaton et al., 1995).

It is becoming more important for claims managers to engage with employers to ensure employees RTW. Disengagement may affect sustained RTW (Life + Health Insurance News, 2014). Occupational factors need to be addressed and employees should be provided with guidance regarding their safety and wellbeing at work. A detailed job description is also necessary to address any RTW barriers. There is also a risk of suicide, with the risk rising to 40.0%, particularly in younger men if they are unemployed for six months or more (Life + Health Insurance News, 2014). By ensuring the RTW of those individuals that are able to, the group life industry has been made more sustainable (Life + Health Insurance News, 2014).

It is important to identify tools for early detection of individuals with back pain who are at increased risk of poor occupational outcomes. This would help focus clinical attention to the individuals who need it most and assist with reducing unnecessary interventions (Dionne et al., 2005). In order to apply early intervention, injuries need to be reported as early as possible (Johnson and Fry, 2002). If a work-related MSK condition is identified early on and if it is treated, the chances of a full recovery and RTW are good. However, if a late diagnosis and intervention takes place, the condition can become chronic and recovery becomes more difficult (Roh, Lee and Kim, 2014).

Individuals with chronic pain disorder should be referred for treatment as soon as possible in order to accomplish a successful RTW (Hamer et al., 2013). Claims need to be screened so that those claimants who are suitable candidates for rehabilitation can be identified. The insurance company, AIA Australia reported that an intervention claims trial which lasted one year resulted in a 48.0% increase in the RTW rate. Initially, capital outlay was high; however, at the end, cost savings were evident. The results appear to be best when insurers work together with employers (Life + Health Insurance News, 2014).

According to Thomas (2015), the Group Risk Development (GRID) reported that 1,529 people were able to RTW during 2014. This was due to insurers intervening before claimants were off work long enough to make a claim. Employers do not have to provide any interventions; however, by offering these services, they have assisted in protecting employees and their dependents against the financial burden of death or prolonged disability. This also benefits society by reducing the reliance on welfare (Thomas, 2015).

A multidisciplinary rehabilitation programme appears to have an influence on the ability to manage ones symptoms even after the rehabilitation programme has ended (Sjostrom, Asplund and Alricsson, 2013). Important predictors of RTW after rehabilitation services include disability benefit status and education level (Straaton et al., 1995).

According to RGA Global Surveys (2012), rehabilitation is relevant to the South African insurance market because utilisation of rehabilitation as an intervention in individual and group insurance claims departments in South Africa was low when compared to other countries. The study conducted by Arnetz et al., (2003) showed that early workplace-based interventions brought about a substantial reduction in sickness absence and costs. An important component in the intervention was the conception of a more active role for the case manager at the insurance company and the introduction of an ergonomist. In order to ensure that insurers use rehabilitation as an intervention, the goals of the rehabilitation function amongst all stakeholders needs to be analysed (Winterbottom, 2015).

Work ability is the individual's capability to perform his/her job whilst considering the particular work demands, individual health condition and mental resources. The Work

Ability Index (WAI) questionnaire measures an individual's work ability (De Zwart, Frings-Dresen and Van Duivenbooden, 2002).

Work ability may be self-assessed by individuals, and these assessments are fairly strong predictors of future rehabilitation and RTW (Miranda et al., 2010). This is confirmed by Paquette (2008) in that an individual's own expectations of recovery were found to be a consistent predictor of the final decision to RTW. Wind et al., (2014) found that individuals are able to forecast the outcome of their disability benefit claim. A low WAI score and expectation of a disability benefit actually predicted the outcome (Wind et al., 2014). Employees with a greater financial need tend to RTW more often, regardless of their health. Individuals who are the main source of income for a household tend to RTW (van der Giezen, Bouter and Nijhuis, 2000).

Workers who have maintained their first RTW, report an improved health status and less work limitations compared to those who have had a recurrence of absence from work or who have never returned to work; however, a sustained first RTW does not necessarily mean a complete recovery from MSK conditions (Bultmann et al., 2007). If first RTW is not sustained, reasons for this could be that claimants may have suffered temporary disability periods and absenteeism from work due to relapses in their condition (Berecki-Gisolf et al., 2012).

Claimant education and advice is of utmost importance and may include guidance on safe lifting techniques, advice on the benefits of early RTW, or reassurance regarding the medical condition (Shaw, Main and Johnston, 2011). Ergonomic education and training also needs to be considered as part of the prevention of MSK conditions; however, this may not be adequate for those presenting with pain (Sundstrup et al., 2014). Ergonomics may require further assessment of occupational health problems (Das and Ghosh, 2010).

The Australasian Faculty of Occupational and Environmental Medicine (AFOEM) of The Royal Australasian College of Physicians (RACP) released the consensus statement on the health benefits of work (RACP, 2009). The evidence shows that work is usually good for recovery, health and wellbeing, and that long term work absence, work disability and unemployment mostly have an undesirable impact on health and wellbeing (RACP,

2009). This is confirmed by Madan and Grime (2015) and Life + Health Insurance News (2014). Return to work is often considered the final level of functional status. Financial losses, for all involved, ceases when an individual returns to work (Paquette, 2008).

2.8 CLAIMS ASSESSMENT

Disability claims assessment is a multidimensional process and is currently largely dependent on a medical diagnosis rather than on the functional capacity of the individual in question (RGA, 2014). The claims assessment and management process has a direct influence on the cost and length of a claim. The earlier notification of a claim enables one to be proactive and to better facilitate early RTW (Johnson and Fry, 2002). In a comparative study, it was found that six months after the onset of pain, individuals who received interdisciplinary early intervention were much more likely to RTW than those who received case management (Hamer et al., 2013). Functional capacity evaluations are also used to assist in making case management decisions (Gross and Battie, 2005).

The assessor needs to determine whether the benefits stipulated under the claimant's policy are payable. Many insurers and reinsurers are looking to change their approach to claims management. Rather than a medically focused model, the goal is to move towards a holistic case management model of claims management. This would take function, capability, work demands, work adjustments and transferrable skills into consideration. It also takes into account the non-medical factors that may affect RTW. Direct telephone interviews with claimants are also encouraged (RGA, 2014) to obtain more information, establish relationships with claimants and to allow more effective claims management.

At times, FCE's are also requested. This is done in order to identify the functional limitations that the claimant may be experiencing, to assess the claimant's readiness to RTW, to possibly resolve differences between providers and insurers, and to advise on the need for further treatment (Shaw, Main and Johnston, 2011). The recommendations made in the FCE report contains important information relating to the claimant's ability to perform their own occupation (with or without taking certain measures to accommodate them in their job) and whether a suitable alternative occupation needs to be explored. Recommendations regarding rehabilitation are also included in the report. Progress reports and discharge summaries, amongst other reports may also be requested (Shaw,

Main and Johnston, 2011). Rehabilitation is often used too late in the claims process or when the claims assessor is uncertain of the next step at a specific point in the claims process (Winterbottom, 2015).

Due to the nature of insurance products and the assessment thereof, the claimant has the opportunity to disclose information to avoid non-disclosure which is vital for the initial policy to be granted at the underwriting stage or for a claim to be approved at the claims stage. In order to determine whether claims are fraudulent, the claims assessor and the underwriter must determine if the claimant has been dishonest and has intentionally not made the insurer aware of pertinent information. The insurer bears the responsibility to prove that a claim has been made fraudulently (RGA, 2014). In order to have a successful claims experience, all stakeholders including the insurer, the reinsurer, the medical professionals and the rehabilitation professionals need to be responsible.

2.9 CASE MANAGEMENT

Communication with the claimant's employer is usually the responsibility of primary care providers, occupational physicians or insurance case managers. It is largely the role of case managers to identify the problem at hand, investigate the problem, depict and formulate potential solutions, and implement the solution (Shaw, Main and Johnston, 2011).

Return to work coordination has been proposed as an effective strategy for encouraging workplace rehabilitation. Return to work coordinators help workers suffering from injuries by seeing to any workplace obstacles that may prevent a safe and early RTW (Hamer et al., 2013). Light duties can be substituted with temporary or permanent work responsibilities that are less strenuous than that of the regular job prior to injury occurrence. Light duties can range from simple adaptations of the pre-injury job to a completely different job, either pre-existing or specially created for disabled workers. Graded work exposure is a specific form of light duties in which the time, duties and/or performance measures of the job are increased slowly until the worker is ready for the full work requirements of the pre-injury job duty (Durand and Loisel, 2001).

Krause, Dasinger and Neuhauser, (1998) found that modified work programmes assisted with RTW for workers that were temporarily and permanently disabled.

Individuals with access to modified work RTW twice as often as individuals without access to modified work (Krause, Dasinger and Neuhauser, 1998).

2.10 DISABILITY PREVENTION

Prevention requires collective effort by many workplace participants. These individuals may include government policy makers, insurers, unions, health professionals, business leaders, managers and supervisors (White et al., 2013).

It has been suggested that a few things can be done to reduce the socioeconomic gaps in disability retirement. This includes primary prevention through health promotion, secondary prevention through early detection and treatment of diseases and tertiary prevention by diminishing the consequences of disability with treatment and occupational rehabilitation (Noone, 2012).

In Korea, legislation pertaining to the prevention of work-related MSK conditions began in 2003. By 2005, regulations were implemented. Of the MSK conditions, occupational disease claimants made up 67.3% (Roh, Lee and Kim, 2014).

A considerable number of workers suffering from injuries experience a second occupational injury or disease, and prevention programmes for these individuals may help to minimise the social, health and financial burden of injury in the workplace (Ruseckaite and Collie, 2011). Participation in a wellness programme was linked to reductions in employee absenteeism (Aldana et al., 2005). Identification of risk factors associated with injury recurrence could therefore potentially assist in prevention of re-injury (Wasiak et al., 2004). Encouragement of leisure time physical activity may be one of the ways of reducing MSK morbidity in the working population and in sedentary workers in particular (Hildebrandt et al., 2000).

Return to work success may be influenced by personal factors, socio-demographic influences, beliefs, attitudes, and motivation. Human resources managers and health care professionals are inclined to attribute workers' motivation to their personal traits. Workers that are injured, their representatives and their health and safety managers linked workplace culture and the extent to which their well-being was considered, was seen to have a strong influence on their motivation. Non-workplace issues comprised of

misunderstandings around the compensation system, the difficulty in communicating with some treating physicians, and the physicians' role in dealing with conflict in that they tried to support claimants whose problems were non-compensable (Baril et al., 2003).

Disability can never be completely eradicated, but its financial expenses can be successfully reduced through improved treatment and rehabilitation. This would be facilitated by claimant education, vocational rehabilitation and better criteria reflecting medical and technological advances. Modifications in the labour environment that affect the skills needed to perform one's work duties and the work settings also need to be considered (Melhorn, Lazarovic and Roehl, 2005, p.7). The collaboration of an occupational and a clinical rehabilitation programme has proved successful for disability and RTW in that individuals actually go back to work (Bultmann et al., 2009).

In conclusion, progression to a chronic pattern of disability is more reliant on demographic, psychosocial and occupational factors than on the medical characteristics of the condition itself. Treatment should be administered without delay and should be comprehensive in these claimants as the likelihood of RTW decreases hastily as sick leave duration increases (Valat, Goupille and Vedere, 1997). This research intends to bridge the gap between the understanding of the various factors that can be modified in order to improve RTW rates in income disability insurance claimants in South Africa.

CHAPTER 3

3. RESEARCH METHODS

3.1 STUDY DESIGN

The research was a retrospective, observational and descriptive study.

3.2 SITE OF STUDY

The data used in this research was from one of the top five largest insurance companies in the Republic of South Africa which offers income disability benefits to claimants. This consisted of physically reviewing files in their Johannesburg offices. The claims considered in this research were made in the Republic of South Africa.

3.3 STUDY DATA

The insurance company providing the data utilised in this research provides income disability insurance products to individuals, amongst other products. Claimants may qualify to receive income replacement benefits following absence from work due to injury or disease. The insurance company pays the benefit on a monthly basis until the injured or disabled claimant can RTW. Depending on the benefit, the monetary percentage of the benefit that the claimant is entitled to on a monthly basis will vary. In the majority of cases used in this study, for the first 24 months (less the waiting period on the policy), the monthly entitlement is 100.0% of pre-injury earnings. From the 25th month onwards, a monthly payment of 75.0% of pre-injury earnings relating to the benefit of the sum assured is paid, but only if the claimant is still unable to work and if they lost income as a result of the injury or the disease.

Claims that were approved between 1 January 2011 and 31 December 2014 were used. Data was obtained from the insurance records during the course of 2015.

This research analysed the following:

- Data of the population that met the inclusion criteria for the study and
- Data from claimants that had submitted income disability claims as a result of MSK conditions arising from any cause whatsoever

For the rest of the sample, the cause of the claim was recorded in order to compare MSK conditions versus other conditions as the cause of claim. The data was then analysed in order to identify factors that contributed to time taken for claimants to RTW.

3.4 SAMPLE SIZE

A consecutive (non-probability) sampling technique was used. All monthly income claims made between 1 January 2011 and 31 December 2014 were included in the analysis. This was estimated at approximately 1000 claims. Duplicate claims were removed. Claims were included in the research if they met the inclusion criteria as is described in Table 3.1 below.

For the analysis, the rule of thumb given by Peduzzi et al., (1996) required that the number of events (RTW in this instance) be at least 10 times the number of parameters estimated. Given that there were 183 claimants that returned to work in this sample, up to 18 parameters could be estimated in the multivariate model, which was reasonable for a study of this nature.

3.5 EXCLUSION CRITERIA

Table 3.1: Exclusion and Inclusion Criteria for the Study

Participant Exclusion Criteria	Participant Inclusion Criteria
Any condition where the MSK condition was not the primary cause for incapacity	Claimants in possession of a monthly income disability benefit who had claimed and been paid between 2011 and 2014
Claims on business expense benefits	Self-employed and salaried individuals
Claims on retrenchments	Claimants with MSK condition/s as the primary reason for not being able to work
Claims on investment policies	If the claim event occurred prior to 2011; however, the claim was paid between 01 January 2011 and 31 December 2014, these claims were included
Income claims covering child lives	
Policies where medical information could not be found	
Lump sum claims relating to maternity	
Lump sum disability claims	
Critical illness claims	
If there was a secondary injury for the same life assured resulting in a claim and the injury met any of the exclusion criteria, it was omitted	
Claims relating to auto-immune conditions, feet, fractures, hands, osteoarthritis and joint replacement, pregnancy related orthopaedic conditions, secondary injuries and significant trauma	

3.6 DATA COLLECTION

A record review of all the claimants that met the inclusion criteria was performed. The data was sourced from a number of databases that stores various information pertaining to claimants and claims. Extraction from one particular system was performed in order to obtain all policy numbers where a payment was made anytime between 01 January 2011 and 31 December 2014.

Spreadsheets with policy numbers were compared with those that had their first claim payment (permanent claims) initiated before 1 January 2011 and with others where reinsurance data is kept. Policies paid prior to 1 January 2011 were removed and policy

numbers from the reinsurance data that were not included in the initial extract were added. Other policies not included in the initial list and where the claim payment occurred prior to 1 January 2011 were also removed as the data was analysed.

Duplicate policy numbers and policies where the same life assured has more than one policy number were removed. The second claim for each claimant was removed. Claims were removed as per Table 3.1 above. Certain policy numbers could not be tracked and a portfolio search had to be completed in order to obtain the correct policy numbers.

Each claimant was assigned a number in place of their name in order to ensure anonymity. The relevant insurance information technology systems containing the relevant demographic and medical information were accessed. The relevant information and data containing the factors that needed to be established were sourced in order to deduce the study conclusions. The policies were first divided into those where the primary reason for a claim was a MSK condition and those where the primary reason for a claim was a non-MSK condition.

Each claim was assessed manually, and information regarding the RTW factors based on previous research (Appendix A) was extracted. The RTW factors assessed included demographic factors, monthly income, smoker status, occupation details, RTW details, disability details, treatment details, rehabilitation details and medication details. Once these factors were sourced, they were imported from the databases into a password protected excel spreadsheet.

Cessation of income replacement payments often reflects a RTW. Although this occurs often, some payment cessations could occur due to the claimant being unable to provide the necessary documentation and medical evidence to prove that they had been booked off work and that they should not be at work due to their medical condition. Death of the claimant, and lapsing and ceasing of policies could also be causes of payment cessation. The exact cause for payment cessation was therefore recorded:

- Claimants who returned to work completely were defined as complete cessation of the income compensation payment at a certain specified date

- Claimants who did not RTW at all were defined as continued full income compensation payment on a monthly basis

The objectives were assessed and compared depending on the time taken to RTW (in days). A pilot study of 10 claims was initially undertaken in order to determine which factors were measurable from the data available.

3.7 VARIABLES

Independent variables included the factors affecting RTW that were recorded and analysed. Demographic data was obtained from the relevant data storage systems at the insurance company. The age of the claimant that was recorded referred to the age of the claimant at the time that the claim was submitted. Table 3.2 below explains where each variable was obtained. Each of the variables in the table below were categorised and used in statistical models.

Table 3.2: Details of Independent Variables

Variable	Category	Details of how the Independent Variables were Collected
Previous Claims	No	Insurance information technology systems
	Yes	
Waiting Period on Policy	7 days backdated	Insurance information technology systems
	1 month	
	3 months	
Age of Claimant at time of first MSK claim/event	20 – 30	Identity number
	31 – 40	
	41 – 50	
	51 – 60	
Gender	Male	Self-reported/identity number
	Female	
Highest Level of Education Attended	Secondary	Self-reported
	Matric	
	Professional/Technical Training	
	University	
Gross Monthly Income Sum Assured	Up to R10 000	Insurance information technology systems
	R10 001 to R15 000	
	R15 001 to R30 000	
	R30 001 to R45 000	

Variable	Category	Details of how the Independent Variables were Collected
	More than R45 000	
Gross Monthly Income Claim Payment	Less than R5 000	Insurance information technology systems/proof of income
	R5 000 to R10 000	
	R10 001 to R15 000	
	R15 001 to R30 000	
	R30 001 to R45 000	
	More than R45 000	
Smoker Status at Time of First Underwriting	Non-Smoker	Self-reported and cotinine test
	Smoker	
BMI (kg/m^2) at Initial Underwriting	18.5 - 24.9 (Normal)	Weight and height performed by nurse at initial underwriting
	25.0 - 29.9 (Overweight)	
	30.0 - 34.9 (Grade 1 Obesity)	
	35.0 - 39.9 (Grade 2 Obesity)	
	≥40 (Grade 3 Obesity)	
Occupation at Underwriting	Managerial/Professional/Technical	Self-reported
	Clerical Support/Services/Sales	
	Skilled Manual Labour	
Length in Occupation at Time of Underwriting	0 - ≤5 years	Self-reported
	>5 - ≤10 years	
	>10 - ≤15 years	
	>15 - ≤20 years	
	>20 years	
Occupation at Claim	Managerial/Professional/Technical	Self-reported/information from employer
	Clerical Support/Services/Sales	
	Skilled Manual Labour	
Length with Current Employer (Days) at Time of MSK Claim	0 - ≤5 years	Self-reported/information from employer
	>5 - ≤10 years	
	>10 - ≤15 years	
	>15 - ≤20 years	
	>20 years	
Type of Employment	Salaried Individual	Self-reported/information from employer
	Self-Employed Individual	
How Long in Occupation at Time of MSK Claim?	≤5 Years	Self-reported/information from employer
	>5 to ≤10 Years	
	>10 to ≤20 Years	
	>20 Years	
Anatomical Region	Lumbar Region	Medical report
	Elbow/Wrist or Forearm	
	Head or Neck	

Variable	Category	Details of how the Independent Variables were Collected
	Lower Limb or Ankle	
	Shoulder	
Previous History of the Same Injury	No	Medical report
	Yes	
Mechanism of Injury	Insidious Onset	Medical report
	MVA	
	Sports Injury	
	Trauma	
Injury Details	Not Work-related	Medical report
	Work-related	
Type of Treatment	Surgery	Medical report
	Other	
Has Claimant had Rehabilitation?	Yes	Self-reported/medical report
	No	
Amount of Rehabilitation	1 healthcare provider	Medical report
	2 or > healthcare providers	
Secondary Injuries Anatomical Region	None	Medical report
	Any	
Taking Medication for MSK	Yes	Self-reported and/or medical report
	No	
Categorised Medication	Analgesia	Self-reported and/or medical report
	Analgesia and Nonsteroidal Anti-inflammatory Drug (NSAID)	
	NSAID	
	None	

Dependant variable: time taken to RTW. The factors analysed could influence the objective measures of time taken to RTW and this was demonstrated.

3.8 DATA ANALYSIS

The first study objective (prevalence of various MSK conditions, according to anatomical region) was presented using descriptive statistics which included tables, graphs, means, standard deviations and percentages. The second study objective (to determine the risk factors associated in predicting RTW) assessed the relationship between the dependent variable (time taken to RTW) and the factors that were expected to affect time taken to RTW. Overall estimates for RTW were determined by the Kaplan-Meier (KM) method. Cox proportional hazard (PH) regression was used to determine the effect of each of the

selected independent variables on RTW. Those who had not returned to work by the time the study ended were regarded as censored observations.

For each of the selected variables:

- A suitable reference category for the analysis was selected. This is usually a logically sensible category (provided it is large enough) or a large or the largest category if there is no obvious choice
- Very small categories (n<15) were either excluded from the analysis, or combined with other categories where possible

Independent variables with p<0.20 in the initial univariate regressions were selected for the multivariate regression model. Confounding between these risk factors was assessed by examining the bivariate relationships between the risk factors (phi coefficient for pairs of binary risk factors, Cramer's V for pairs of categorical risk factors). Strongly associated predictor variables cannot be used together in a multivariate regression. The identified risk factors were analysed in a multivariate Cox PH regression; non-significant (p≥0.05) risk factors were removed sequentially from the model until only significant risk factors remained. Microsoft Excel 2010 and the statistical software SAS, version 9.4 for Windows were used to analyse the research data. P-values <0.05 indicated significant results.

3.9 ETHICAL CLEARANCE

An ethical clearance was approved by the Human Research Ethics Committee (HREC) of the University of the Witwatersrand M140612 (Appendix C). All data was coded to maintain claimant confidentiality. Written consent was obtained from the institution providing the data (Appendix B). All names, logos and company information have been removed from the written consent letters in order to ensure confidentiality.

CHAPTER 4

4. RESULTS

4.1 CHARACTERISTICS OF THE STUDY GROUP

A total of 949 claims were processed during the study time frame and were included in the analysis. Of the 949 claims, 438 (46.0%) claims were as a result of MSK conditions. Overall, 238 MSK claims that did not meet the study's inclusion criteria were excluded from the study as shown in Figure 4.1 and Table 4.1 below.

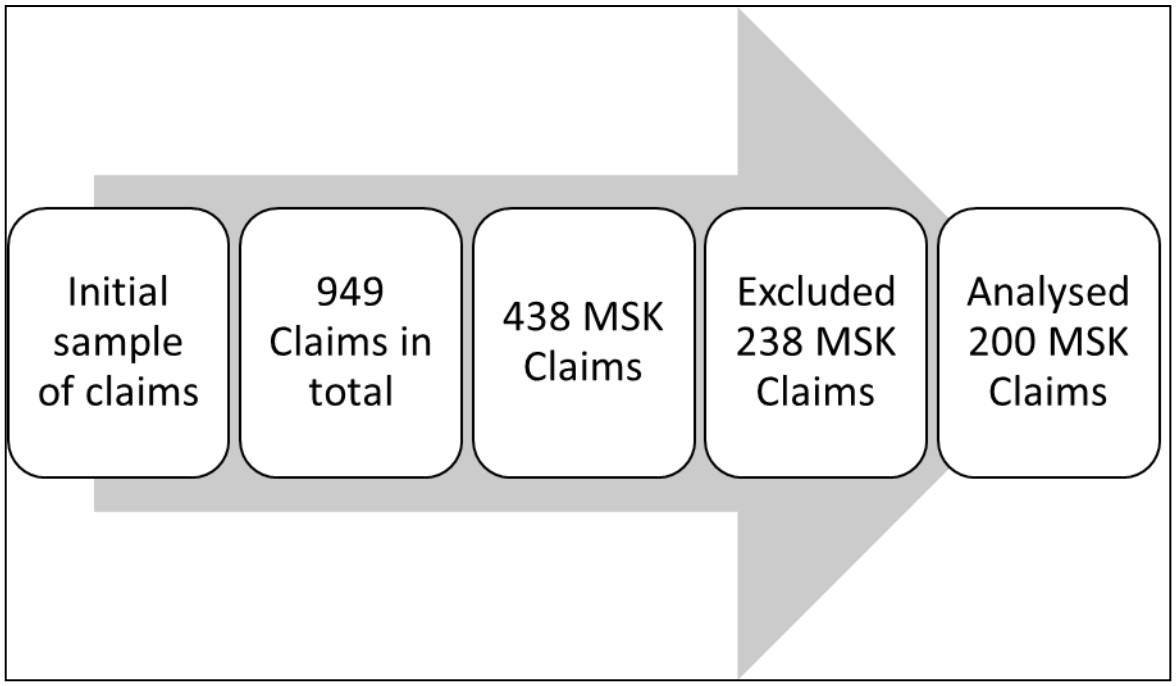

Figure 4.1: Graphic Representation of the Data Preparation

Table 4.1: Number of Claims Excluded from the Study

Claims Excluded	Number of Claims
Auto-immune conditions	14
Foot injuries	20
Fractures	125
Hand injuries	25
Osteoarthritis and joint replacement	27
Pregnancy related orthopaedic conditions	1
Secondary injuries	8
Significant trauma	18
Total claims excluded	238

Table 4.2: Demographic (N=200) Characteristics of the Study

Categories and Variables	Mean (SD)
Age (years)	41 (8.5)
Weight (kilograms)	85 (15.5)
	N (%)
Gender	
Male	157 (79.0%)
Female	43 (22.0%)
Body Mass Index at Underwriting (kg/m^2)	
Underweight (<18.5)	2 (1.0%)
Normal (18.5-24.9)	63 (31.5%)
Overweight (25.0-29.9)	85 (42.5%)
Grade 1 Obesity (30.0-34.9)	28 (14.0%)
Grade 2 Obesity (35.0-39.9)	10 (5.0%)
Grade 3 Obesity (≥40)	1 (0.5%)
Unknown	11 (5.5%)
Highest Level of Education	
Unknown	4 (2.0%)
Secondary	8 (4.0%)
Matric	25 (12.5%)
Professional/Technical Training	70 (35.0%)
University	93 (46.5%)

	N (%)
Occupation at Claim	
Managerial/Professional/Technical	160 (80.0%)
Skilled Manual Labour	28 (14.0%)
Clerical Support/Services/Sales	12 (6.0%)
Type of Employment	
Self-Employed Individual	121 (61.0%)
Salaried Individual	77 (39.0%)
Unknown	2 (1.0%)
Smoking	
Yes	53 (27.0%)
No	143 (72.0%)
Unknown	4 (2.0%)
Monthly Income Sum Assured (what the claimant was insured for)	
Less than R5 000	2 (1.0%)
R5 000 to R10 000	16 (8.0%)
R10 001 to R15 000	29 (14.5%)
R15 001 to R30 000	85 (42.5%)
R30 001 to R45 000	33 (16.5%)
More than R45 000	35 (17.5%)
Monthly Income Claim Payment (what was actually paid to the claimant)	
Less than R5 000	18 (9.0%)
R5 000 to R10 000	30 (15.0%)
R10 001 to R15 000	36 (18.0%)
R15 001 to R30 000	69 (34.5%)
R30 001 to R45 000	29 (14.5%)
More than R45 000	18 (9.0%)
Treatment Type	
Surgery	161 (80.5%)
Other	38 (19.0%)
None	1 (0.5%)

4.2 DEMOGRAPHIC DETAILS

Most claims were made by claimants residing in Gauteng. Race and marital status could not be used as the information for the majority of claimants was unknown. The mean

age of claimants in years was 41. Males made up the majority of the sample with 79.0%. Overweight BMI classifications made up 42.5% of the sample.

The majority of claimants in the sample:

- Had a university qualification (46.5%)
- Had occupations classed as managerial/professional/technical at claims stage (80.0%)
- Were self-employed individuals (61.0%)
- Were non-smokers (72.0%)
- Were insured for between R15 001 to R30 000 per month (42.5%)
- Were paid between R15 001 to R30 000 per month (34.5%)
- Had surgery as treatment (80.5%)

4.3 PREVALENCE OF CONDITIONS

Figure 4.2 below shows that there were 58 MSK conditions involving the lumbar region (29.0%) and that this was the most prevalent MSK condition in this study sample followed by MSK conditions of the lower limb or ankle (25.0%). Musculoskeletal conditions involving the thoracic region or chest (0.5%) were the least common. Other regions involved include the shoulder, the head or neck, the elbow/wrist or forearm and the hip.

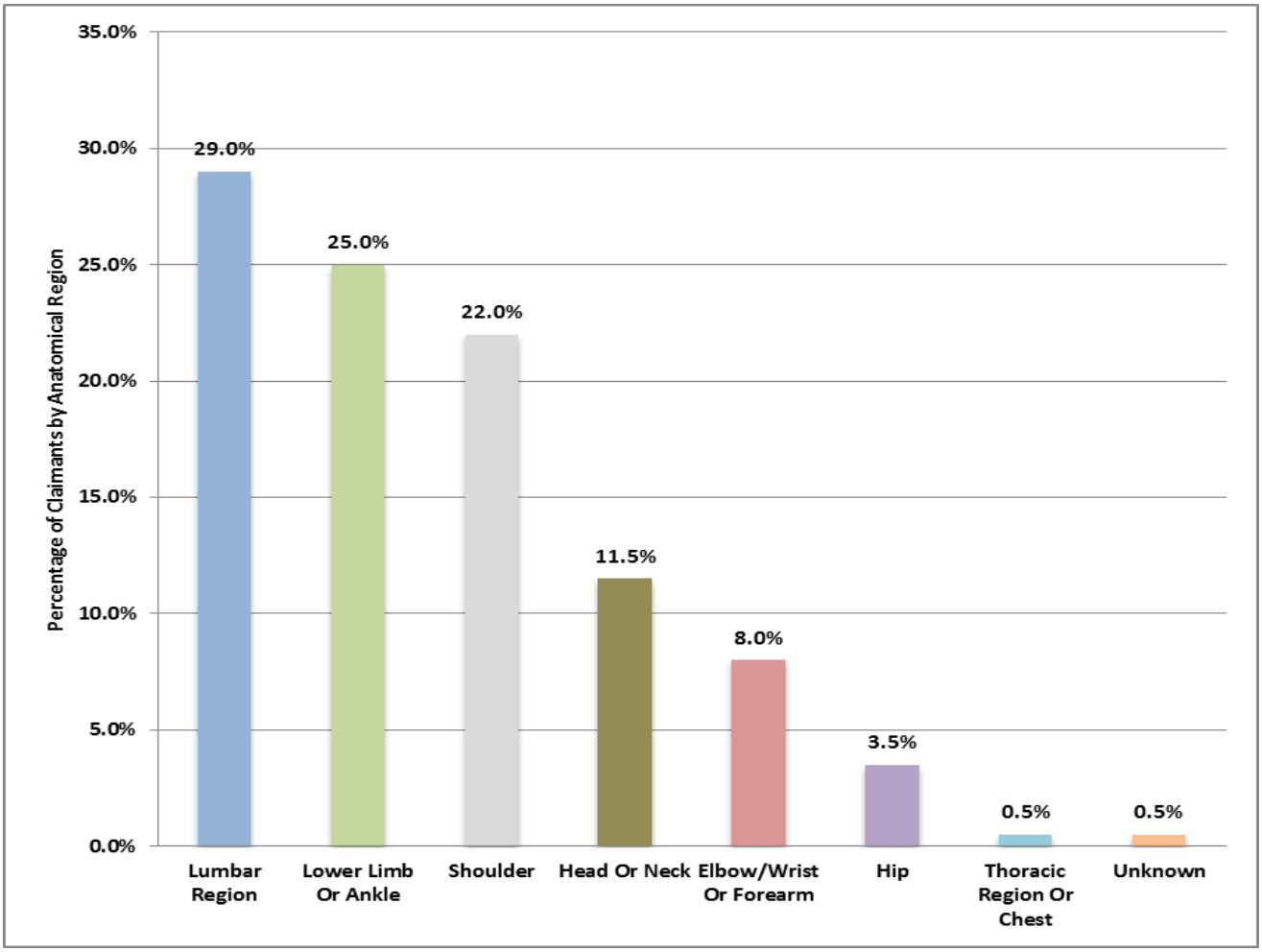

Figure 4.2: Split of Claims by Anatomical Region

4.4 OVERALL TIME TAKEN TO RETURN TO WORK

The overall RTW curve, together with its 95% confidence interval (CI), is shown below. The y-axis shows the proportion of cases that had not returned to work at a specified time. In all the figures below, survival probability refers to RTW probability.

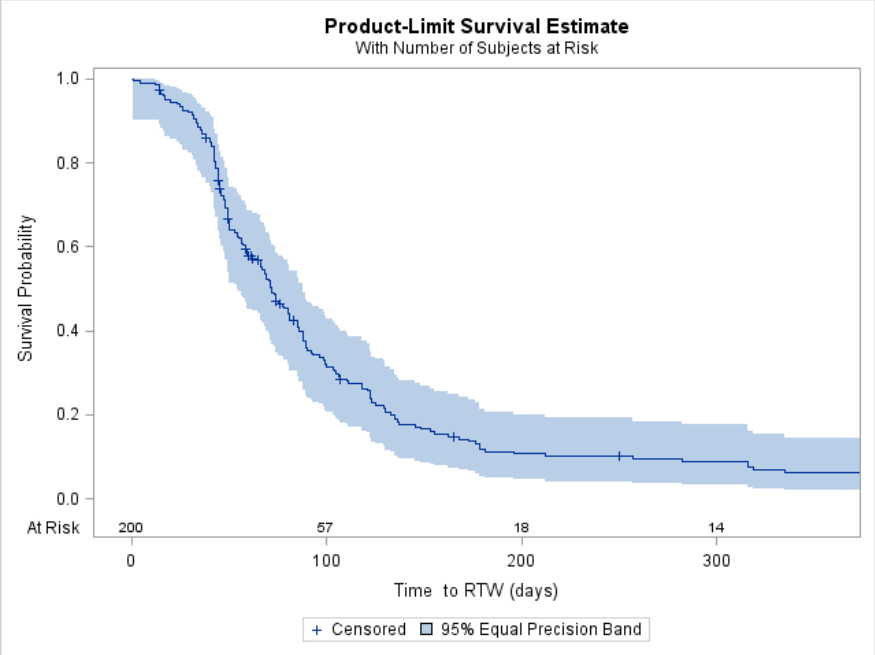

Figure 4.3: Overall Return to Work Curve

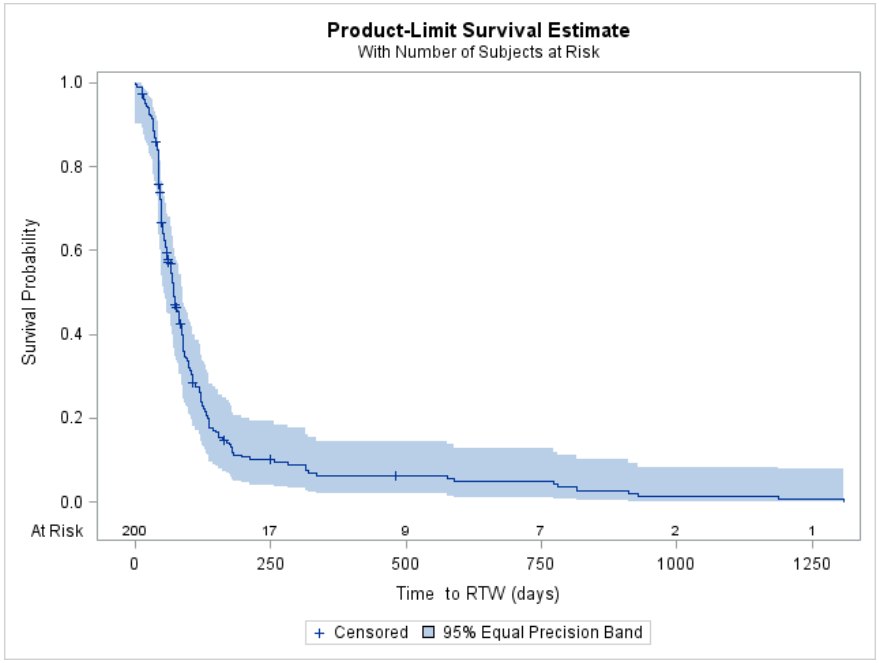

Figure 4.4: Return to Work Curve for the First 365 Days

The number of cases at risk beyond 250 days is very small (<20) and thus the remainder of the curve (longer RTW times) should not be over-interpreted. It is more useful to look at the RTW curve for only the first 365 days.

The key non-RTW probabilities are shown in Table 4.3 below. Therefore; after 90 days, 35.3% of the cases had not returned to work. The median RTW time was 72 days (95% CI: 65 - 81 days).

Table 4.3: Overall Return to Work

Time (days)	% not RTW	95% confidence interval for non-RTW	
30	92.0%	87.2%	95.0%
60	57.8%	50.6%	64.4%
90	35.3%	28.5%	42.2%
180	11.9%	7.6%	17.2%
365	6.3%	3.3%	10.7%

4.5 FACTORS ASSOCIATED WITH RETURN TO WORK

Refer to the Table in Appendix D for the univariate Cox PH regression assessing factors associated with RTW.

The variables from the univariate analysis that had no significant effect on time taken to RTW were as follows:

- Previous claims (yes/no)
- Age at time of claim
- Gender
- Smoking status
- Body mass index at underwriting
- Length in occupation at time of underwriting
- Length with current employer at time of claim
- Length in occupation at time of claim
- Type of employment (salaried or self-employed)
- Anatomical region
- Previous history of same injury
- Mechanism of injury
- Injury details (work/non-work related)
- Type of treatment (surgery/other)
- Rehabilitation (yes/no)

- Amount of rehabilitation
- Secondary injuries (none/any)
- Taking medication for MSK condition (yes/no)
- Medication for MSK condition

The following variables from the univariate analysis that had some p-values below 0.20 were retained for the multivariate analysis:

- Length in occupation at time of underwriting
- Length in occupation at time of claim
- Anatomical region
- Mechanism of injury
- Type of treatment (surgery/other)
- Medication for MSK condition

The variables which were significant ($p<0.05$) in the univariate model are as follows:

- Waiting period on policy
- Highest level of education
- Gross monthly income sum assured
- Gross monthly income claim payment
- Occupation at underwriting
- Occupation at claim

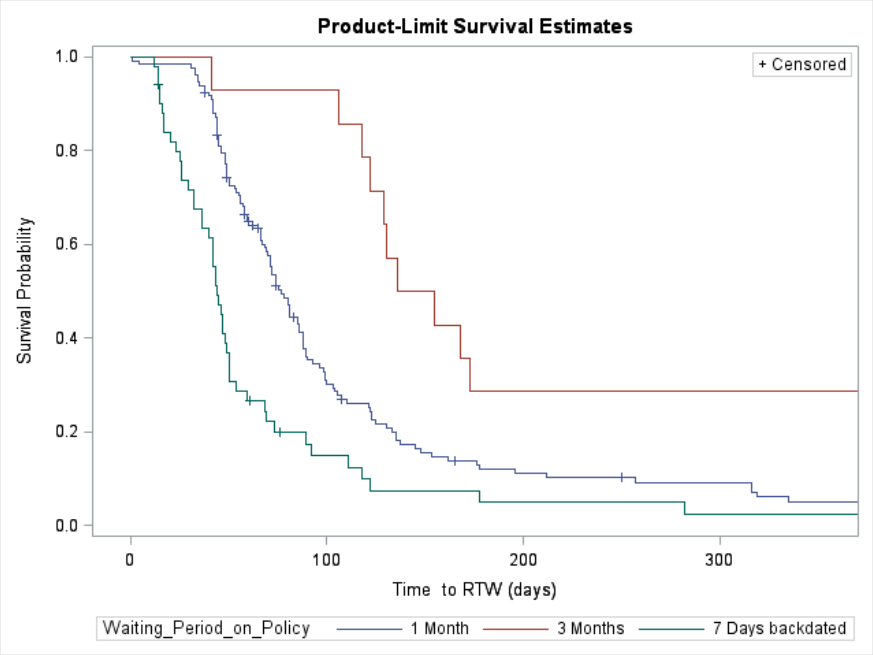

Figure 4.5: Curve Showing Waiting Periods on Policy

4.5.1 Association between Independent Variables

Gross monthly income sum assured and gross monthly income claim payment were strongly associated (Cramer's V = 0.62). We retained the more recent of the two variables: gross monthly income claim payment.

Occupation at underwriting and occupation at claim were very strongly associated (Cramer's V = 0.95). We retained the more recent of the two variables: occupation at claim.

Length in occupation at time of underwriting and length in occupation at time of claim were strongly associated (Cramer's V = 0.53). We retained the more recent of the two variables: length in occupation at time of claim. No other strong associations were shown between any pairs of the remaining variables. They were thus all included in the multivariate model.

4.5.2 **Multivariate Analysis**

Table 4.4: Multivariate Cox Proportional Hazard Regression Assessing Factors Associated with Return to Work

Variable	Category	P-value	Hazard Ratio	95% Confidence Limits for Hazard Ratio	
Waiting Period on Policy	7 days backdated		1.00	Reference	
	1 month	**<0.01**	0.46	0.32	0.66
	3 months	**<0.01**	0.12	0.05	0.24
Highest Level of Education Attended	Secondary/Matric	**0.01**	0.64	0.45	0.91
	Professional/Technical Training	0.07	0.62	0.36	1.04
	University		1.00	Reference	
Gross Monthly Income Claim Payment	Less than R5 000	0.17	1.55	0.82	2.93
	R5 000 to R10 000	**<0.01**	3.26	2.00	5.32
	R10 001 to R15 000	0.08	1.46	0.95	2.26
	R15 001 to R30 000		1.00	Reference	
	R30 001 to R45 000	0.57	0.87	0.54	1.41
	More than R45 000	0.19	0.68	0.38	1.21

The final variables which were significant in the multivariate model are as follows:

Waiting Period on Policy

Policies with waiting periods of 1 and 3 months (compared to the reference category of 7 days backdated) were significantly slower to RTW (Hazard Ratio's (HR's) of 0.46 and 0.12, respectively; 95% CI's of 0.32 - 0.66 and 0.05 - 0.24 respectively), controlling for the other variables in the model.

Highest Level of Education

Claimants with secondary/matric education were significantly slower to RTW (HR of 0.64; 95% CI's of 0.45 - 0.91) than those with a higher education (professional/technical training and university) controlling for the other variables in the model.

Gross Monthly Income Claim Payment

Claimants that were paid R5 000 – R10 000 (compared to the reference category of R15 001 – R30 000) were significantly faster to RTW (HR of 3.26; 95% CI's of 2.00 - 5.32).

Nine parameters were estimated, which is within the limits imposed by the sample size restrictions discussed earlier. The multivariate model confirms the strongest effects seen in the univariate models.

The variables that were not significant included length in occupation at time of underwriting, length in occupation at time of claim, anatomical region, mechanism of injury, type of treatment and medication.

CHAPTER 5

5. DISCUSSION

This study addressed the relationships between the factors affecting RTW following MSK conditions in income disability insurance claimants in South Africa. The aims of this study were to assess the prevalence of various MSK conditions, according to anatomical region in claimants claiming under their income disability benefits, to determine the risk factors associated in predicting RTW and to propose practice and policy guidelines for the benefit of insurance companies, based on evidence-based research and the findings of the current study.

5.1 PREVALENCE OF MUSCULOSKELETAL CONDITIONS

Musculoskeletal conditions involving the lumbar region were most prevalent in this study sample and this is consistent with the findings in the literature. According to Guo et al., (1999) the most frequent reason for filing workers' compensation claims is back pain. According to Walker (2000), chronic back pain is the most widely occurring MSK condition. In developed nations, chronic back pain is the most frequent cause of disability, and in Africa low back pain is a concern as it is on the increase (Louw, Morris and Grimmer-Somers, 2007). In the 2012 Global Burden of Disease Study, low back pain was found to be the top cause of disability overtaking 290 other conditions (Hoy et al., 2014; Buchbinder et al., 2013). The lifetime prevalence of low back pain is approximately 40.0% (Manchikanti et al., 2014). In another study, the lifetime prevalence of low back pain was said to be as high as 84.0% (Balague et al., 2012). In developed countries, low back pain costs approximately 2.0% of gross domestic product (Darlow et al., 2012). Non-developed countries tend to experience the majority of the burden of injury leading to death and disability (Spiegel et al., 2008).

The second most prevalent MSK condition in this study included conditions of the lower limb or ankle (25.0%). Ankle arthritis in particular has a prevalence of 1.0% to 4.0% Kraus et al., (2013) and accounts for 3.0% to 5.0% of emergency department visits in the United Kingdom (Doherty et al., 2014). In Australia, chronic MSK ankle conditions affect nearly 20% of the population (Hiller et al., 2012). Furthermore, MSK conditions of the shoulder were the third most prevalent condition in this study making up 22.0% of the sample. According to Codsi and Howe (2015), the prevalence of shoulder conditions

is 7.0% to 10.0% whereas, in the Netherlands, the prevalence of shoulder pain is 21.0% (Randhawa et al., 2015). In South Africa, the costs associated with injuries including medical treatment, rehabilitation and administration costs billions of Rands (Bowman et al., 2010). Therefore, assessing the prevalence is important for prevention programmes, worksite interventions and case management.

5.2 FACTORS ASSOCIATED WITH RETURN TO WORK

5.2.1 Waiting Periods on Policies

The majority of policies in this study had a one month waiting period. In the current study, the waiting period on the policy was found to significantly increase the time taken to RTW. Claimants with longer waiting periods (one and three months), were slower to RTW compared to claimants with seven day backdated waiting periods. This finding determines that they needed to be booked off work for at least one month or three months (depending on the waiting period of the policy) before they were able to actually submit a claim. Therefore, claimants with injuries requiring longer time off work meet the abovementioned waiting periods and have a reduced chance of RTW (Vlasveld et al., 2012). These claimants qualify for monthly income payments in cases where the claimant has also lost income. A greater period off work due to sickness or disability reduces the likelihood of a RTW which results in long-term absence or disability. More holistic underwriting is therefore required in that in addition to medical information being scrutinised at underwriting stage, social information should also impact the underwriting decision (Bakker et al., 2006). According to the study by van Doorn (1995), a waiting period of 14 days or more reduced the risk of claiming whereas waiting periods of 30 days or more prevented claims for relapses of low back problems in particular. However, with early intervention, the duration off work for low back pain decreased. Hamilton and Hall (2003) found that the claim duration was longer as the waiting period increased and obtaining further medical information at application stage of the policy was beneficial. At 60 days into the claim, 57.8% of claimants had not returned to work. Therefore, as deduced from this study, if half of the claims were managed proactively by the insurer, such as providing some form of intervention, the risk of long term claims may have been reduced.

5.2.2 Highest Level of Education

The percentage of claimants in the sample that had achieved a university qualification was 46.5% whereas 35.0% attained a matric education. A possible reason why the individuals with a university education made up most of the claims in the study sample could be because this group has the most income benefit policies compared to the other groups. The data analysis shows that claimants with secondary/matric education (4.0% and 12.5% of the total sample respectively) were all slower to RTW. Similarly, the Netherlands National Institute for Social Insurance (LISV) found that the long-term disability risk is higher for individuals with a lower education status (Hamer et al., 2013; Bakker et al., 2006). This may be due to many of these workers being unskilled with less job responsibility thus RTW may not be an urgent issue. Education level should therefore be taken into account and more detailed information should be called for when insurers underwrite new business and when a claim is assessed. This is due to the increased cost that may be incurred when a claim is submitted by individuals fitting these demographics as they will be off work for longer periods of time. From a claims perspective, the insurer needs to intervene earlier in order to assist these claimants with RTW.

5.2.3 Gross Monthly Income Claim Payment

Claimants that were paid between R5 000 – R10 000 on a monthly basis (compared to the reference category of R15 001 – R30 000) were quicker to RTW. Interestingly, these claimants had a mixture of education levels. This made up 15.0% of the total sample. Bakker et al., (2006) explain that reinsurance companies have reported on various factors that influence claim behaviour. Claimants with very large sum assureds on their policies may benefit financially from disablement and therefore, the motivation to RTW may be reduced. In this study, most claimants were insured for and were paid their monthly income benefit of between R15 001 and R30 000 which is not the highest possible sum assured available. It must be stressed that some individuals falling into this monthly income claim payment category could be overinsured, depending on what their actual earnings are. This is called the replacement ratio. van Doorn (1995) found that the level of the replacement ratio increases the risk of submitting a claim. Maestas, Mullen and Strand (2013) found that employment would have been higher had disability benefits not been received. According to Kostol and Mogstad (2013), claimants who receive financial benefits from insurance due to disability are discouraged to RTW even if they

have some work capacity. The consideration of financial work incentives is therefore important to encourage claimants to RTW.

The decision to continue with the payment of monthly income benefits due to disability if the claimant is able to RTW can have financial, emotional and physical consequences. Therefore, it is important that the correct claims decision regarding the claimant's RTW is made. Prinz and Tompson (2009) explain that in 2007, there were more individuals claiming disability benefits than there were unemployed individuals. Therefore, by assisting in a RTW, a quicker recovery can be facilitated.

5.2.4 **Anatomical Region**

In this study, 58 (29.0%) of claimants had MSK conditions of the lumbar region making it the most common injury region in the study, which is consistent with the findings in the literature (Storheim and Zwart, 2014). On the other hand, the results of this research depict that having low back pain was not a significant predictor of lodging a claim. Storheim and Zwart (2014) found that the second most common cause of disability globally is MSK conditions. In this group, low back pain is the most common condition. According to Cohen (2015), neck pain is also prevalent (30.0%) and the fourth main cause of disability. In this study, the second most common condition was made up of conditions involving the lower limb or ankle, despite the exclusion of fractures.

According to Manchikanti et al., (2014), low back pain subsides in about 80.0% to 90.0% of cases in approximately six weeks and 5.0% to 10.0% of individuals develop persistent back pain. They report that this concept has been questioned as low back pain often relapses and many individuals experience numerous occurrences years after the initial episode. Thorough follow up is necessary, especially in individuals who have not recovered within the initial three months (Itz et al., 2013). Even more important is intervention for those claimants that have not made a RTW after one month as they are at risk for long-term work absenteeism (Wynne-Jones et al., 2014). Therefore, claims relating to low back pain should be proactively managed as early as possible. Early intervention that includes a multidisciplinary approach is best to ensure RTW (Hoefsmit, Houkes and Nijhuis, 2012). Details pertaining to rehabilitation were not available for all insurance claimants in this study and should be considered in future claims management, as the literature shows that the earlier rehabilitation commences, the

better the chances of RTW. Shiels, Gabbay and Ford (2004) found that claimants with back pain RTW sooner than claimants with other MSK conditions. Considering that in this study, conditions involving the lower back made up the most common reason to make a claim; this should be recognised as an opportunity for insurers to assist these claimants in RTW sooner.

Therefore, when a claim is lodged, insurers should consider sending out introductory educational information to claimants pertaining to work ergonomics, back protection and how to prevent re-injury.

5.2.5 **Age**

Shiels, Gabbay and Ford (2004) found that age is an important risk factor for RTW. The older a claimant is, the longer the period that they are off work. Age was not found to be significant in this study; however, this may be explained by the fact that the age range was narrow, and most claimants in this study were between 41 and 50 years of age.

5.2.6 **Gender**

According to Bakker et al., (2006), disability among women is higher when compared to men. Shiels, Gabbay and Ford (2004) found that men had greater sickness absence and disability occurrences than women. In this study, men made up the majority of claimants with 157 (78.5%) men. Another reason for this notable difference could be that more men have insurance policies compared to women. Furthermore, more men may be breadwinners compared to women and they therefore need to RTW quicker. Gender was not a significant factor in this study and therefore, a larger sample would be required to deduce final conclusions. Zungu (2009) also found in their study that gender was not a significant factor.

5.2.7 **Body Mass Index**

A body mass index (BMI) greater than 30 indicates that an individual is obese (Niverthi and Ivanovic, 2001). Hamilton and Hall (2003) found no association between BMI and making a claim; however, according to Bakker et al., (2006), a BMI greater than 27 is a risk factor. Interestingly, in this study, although BMI (>25) was not significant, 42.5% of claimants in this sample were classified as overweight at the underwriting stage of the policy. Body mass index is not usually reassessed at the time a claim is submitted and is

largely a focus at the time the policy is underwritten. Globally, approximately 1.3 billion people are overweight. In South Africa, it has been reported that 56.0% of women and 29.0% of men have been classified as overweight (Wand and Ramjee, 2013). The prevalence of claimants being overweight and obese in this study is concerning as an undesirable BMI increases the risk of comorbid conditions like diabetes, high blood pressure, heart disease, cancer, stroke and many other diseases (Shah and Braverman, 2012) and is strongly associated with adverse outcomes post-surgery (Toossi, Norman and Johanson, 2016). Obesity is associated with increased risk of work-related MSK disorders and low back pain in particular (Wertli et al., 2016). Therefore, education pertaining to obesity as well as advice on obesity prevention is necessary.

5.2.8 **Type of Employment**

During the underwriting stage and at the claim stage of the policies, 80.0% of the claimants' occupations were classified as managerial/professional/technical. The remainder of the claimants in the study consisted of 13.5% skilled manual labourers and clerical support/services/sales made up the remaining 6.5%. Claimants that were skilled manual labourers at underwriting stage and at claim stage (HR 0.46; 95% CI 0.29 - 0.73 and HR 0.48; 95% CI 0.30 - 0.76) respectively were slower to RTW than those that had managerial/professional technical occupations. Although the occupation group of skilled manual labourers was found to be significant in the univariate model, the significance was lost in the multivariate model. Ruseckaite and Collie (2011); Johnson and Fry (2002) explained that individuals that need to perform manual activity are at increased risk of claiming compensation (Noone, 2012).

The study by Hamilton and Hall (2003) found that manual workers have higher rates of absenteeism when compared to professionals, and a condition that renders a manual worker disabled may have little or no effect on a sedentary worker. According to Xinming et al., (2015), improper workstation design in a manufacturing environment affects workers health and safety. Furthermore, an increased amount of physical workloads increased the risk of long term sickness absence (Andersen et al., 2015). Insurers are not aware of this particular information. Manual labourers often pay a larger insurance premium due to the nature of their work and the risks involved. Most claimants were in the same occupation for at least 5 years at the time of claim. Interestingly, according to Biernat (2015), manual labour has been replaced by machinery reducing the physical

aspects of many jobs. In these instances, educational programmes that promote health and fitness are important to improve work related injuries and absenteeism rates.

5.2.9 Smoker Status

Although Bakker et al., (2006) found that smoking is associated with absence from work due to illness, in this study it was found that 71.5% of the claimants were non-smokers at the time of underwriting, and therefore these conclusions could not be drawn. Discontinuing smoking reduces absenteeism and amounts to a considerable cost saving for employers, Weng, Ali and Leonardi-Bee (2013) whereas smokers increase costs for private employers (Berman et al., 2014). Furthermore, smokers report work-related stress and job strain marginally more than non-smokers (Heikkila et al., 2012).

5.2.10 Treatment Type

The percentage of claimants that underwent surgery for their MSK condition was 80.5%. This is the majority of the study sample; however, there were limited details available pertaining to the surgeries. All claimants' conditions were diagnosed by a medical practitioner. Most (81.5%) of the claimants had rehabilitation for their condition and 89.8% of these claimants made a RTW. However, details relating to rehabilitation and time taken to RTW after surgery are lacking. Details pertaining to psychological factors were also not available and could therefore not be included in this study. This could also be as a result of this study being a study of a low income country and socioeconomic factors. Starting rehabilitation interventions as early as possible can reduce the time off work and help to improve outcomes (Hamer et al., 2013). Interventions at work have also been found to decrease absence due to MSK conditions (Grete and Jensen, 2013).

5.3 PRACTICE AND POLICY GUIDELINES

Hamilton and Hall (2003) believe that underwriting income protection policies is an art rather than a science and that having recent illnesses at the time of underwriting increases the likelihood of claiming. In their study, low back pain was not a significant predictor of making a claim; however, this may be due to underwriters applying exclusions on those policies. Although exclusions of certain medical conditions are often placed on policies at underwriting stage, it is often not possible to successfully apply these exclusions at claims stage. Hamilton and Hall (2003) confirm that individuals with exclusion clauses on their policies have more claims than those without any exclusions.

This therefore needs to be considered to ensure that the correct premium is collected on these policies as these individuals are unhealthy and are more likely to claim more often.

Research has shown that individuals with lower back problems prior to underwriting as well as psychosocial problems at the commencement of disability are strongly associated with the duration of lower back disability (Bakker et al., 2006). Evidence-based underwriting practices and careful scrutiny are therefore necessary for claimants who have a previous history of lower back problems to determine whether insurance cover should be granted or not.

At underwriting stage of policies, claimants with longer waiting periods (one and three months) took longer to RTW. To avoid claims for minor health conditions, insurers pose waiting periods on policies (Bakker et al., 2006). Therefore, the longer the waiting period on the policy, the more costly it becomes and the less likely claimants are to RTW. In addition, sickness absence has been shown to be a significant predictor of sickness absence reoccurring again in the future (Lindberg et al., 2005). It may be valuable to look at applicants' previous sick leave records in order to consider their behaviour with regards to absence from work in the risk assessment. The longer a claimant is off work due to disability, the more difficult RTW becomes (Haukka et al., 2015). Workplace-based rehabilitation programmes assist in RTW (Gagnon et al., 2013; Cheng and Hung, 2007). In these instances, when a claim is made, it may be valuable to send out educational information to these claimants and encourage the start of rehabilitation as early as possible. Insurance companies cannot contribute financially to medical treatment as they are not registered as a medical scheme. Therefore, insurers need to consider funding the costs of RTW programmes as a whole without contravening the Medical Schemes Act No. 131 of 1998 (Pearmain, 2000).

From this study, it was also evident that claimants with secondary/matric education were slower to RTW (HR 0.64; 95% CI 0.45 – 0.91). This has been confirmed in other studies in that the risk of long-term disability is greater for individuals with a lower education status (Hamer et al., 2013; Bakker et al., 2006). Therefore, insurers should consider flagging these high risk claimants so that an active case management approach can be initialised. Case management based rehabilitation programmes have assisted in reducing work absenteeism in the long term (Smedley et al., 2013).

At claims stage, education regarding RTW would be beneficial for these claimants. Educational material may include pamphlets, books, videos, discussions with healthcare professionals and the internet. Education together with other active interventions like rehabilitation appears to be most effective for recovery (Randhawa et al., 2015; Yu et al., 2014). A mixture of work-related and clinical interventions were found to be most beneficial and improve work ability (Wahlin et al., 2013). Furthermore, additional detailed demographic and medical information should be collected so that insurers have more information regarding their claimants. This will enable better underwriting and claims practices in that information on habits and risk factors can be collated and used at various stages throughout the life of the policy. The medical model is usually the primary focus and it may therefore be better to use a more holistic approach by also taking social factors into consideration (Bakker et al., 2006). This will also enable better underwriting and claims practices and the data can be used to develop future practices.

Early education and hands on intervention should be considered for claimants with the mid-range of cover category (between R15 001 – R30 000) as they are slower to RTW. MacDonald (1997) found that obtaining medical reports from the claimant's medical practitioner and having the claimant undergo a medical assessment are costly and are only used when there is concern with the claimant's medical history or for large sum assureds. It can however be seen that it is the mid-range of cover that is of concern in this study sample and insurers should therefore reconsider these requirements. Insurers tend to focus on the very large sum assureds at underwriting and at claims stage; however, from this study, it can be seen that the majority of claims did not arise from the group with the largest sum assured values.

One of the most common symptoms of MSK conditions is pain. Claims management principles should include the documentation of the claimant's pain at various intervals in order to track the recovery process. Furthermore, Hamilton and Hall (2003) explain that much of the medical literature does not use the ability to work as an outcome measure and therefore the use of WAI's during the claim would ensure better claims handling and effective case management. It is preferable to accept a long term claim from inception instead of expending time and resources in an attempt to get a claimant back to work when it is unlikely that they will RTW. If more detailed information regarding the condition, treatment and claimant motivation is obtained initially and throughout the

claims process, more informed decisions can be made in respect of effective claims management.

Standard rehabilitation reports should be considered for insurers which could include information on pain scales, the WAI, details of treatment and prognosis in order to make better claims decisions and to improve case management. It would also give the insurer an indication of the claimant's expected recovery period and the claim can then be monitored more effectively. This information is usually obtained from the claimant's treating doctor, but not from the rehabilitation provider and this should therefore be taken into consideration. This data should also be in a standard format and make future research more accurate and easier to execute. According to Wahlin et al., (2012), for claimants with MSK conditions, those that were healthier with optimistic expectations of RTW and better work ability actually made a RTW.

Once the claim on a certain MSK condition is received, the insurer should consider sending out introductory educational information to the claimant pertaining to their condition, work ergonomics and re-injury prevention. Furthermore, rehabilitation contracts should be considered for those claimants that would benefit from hands on treatment to assist in their RTW. There is an increased risk of no RTW for those individuals with greater long-term sick leave before receiving active rehabilitation (Oyeflaten et al., 2014).

It is important to learn from the experiences of other markets. In general, long-term claims affect claim costs. In Australia, the claims experience between 1990 and 2000 deteriorated as a result of the economy. This then reoccurred again which resulted in significant financial losses. Claims management approaches had to be changed in order to keep up with changes in the market (Wells and Barrett, 2013).

From this study, it is evident that claimants with longer waiting periods on their policies, claimants with secondary/matric education, and those with the mid-range of monthly income claim payments, need more assistance to RTW and to be followed up with more often when compared to the rest of the study sample. Claimant education is an imperative part of the recovery process and may also assist in the prevention of the same or similar injuries occurring again in future. There is strong evidence to support

this finding, particularly regarding pain management and return to activity in order to facilitate RTW. Providing claimant education together with psychosocial intervention, direct instruction, printed resources and discussion appears to be most effective in facilitating RTW (Lockwood et al., 2015). Maintaining an active lifestyle instead of bed rest assists in the recovery of MSK conditions (Haukka et al., 2015). Sending out educational information to claimants pertaining to their conditions could therefore be very beneficial and encourage a proactive approach to recovery. This could result in shorter times taken to RTW. In a study by Andersen et al., (2015), tailored physical activity was found to facilitate RTW and a chronic pain self-management programme was found to be more effective than the reference group. Making use of a multidisciplinary approach in the form of clinical, educational and occupational modalities is best and is more cost effective than focusing on only one modality in isolation (Schultz et al., 2013). The independent factors mentioned above therefore affect the time taken for claimants to RTW.

Table 5.1: Summary of Practice and Policy Guidelines Based on Study

Variables and Concepts	Recommendations
Waiting periods of one and three months on policies	More holistic underwriting is required. In addition to medical information being scrutinised at underwriting stage, social information should also impact the underwriting decision as these claimants are slower to RTW. It may be valuable to look at applicants' previous sick leave records as part of the risk assessment in order to consider their behaviour with regards to absence from work.
Highest level of education (secondary/matric education)	More medical reports should be obtained at underwriting stage of the policy. Individuals that fit these demographics should pay the correct premium for their policies. Claimants with lower education status are high risk of increased time taken to RTW and therefore an active case management approach should be initialised as early as possible when a claim is submitted to facilitate improvements in time taken to RTW. Evidence suggests that education of claimants can facilitate RTW.
Gross monthly income claim payment of R15 001 – R30 000	Insurers should intervene as soon as possible when claims are submitted for this range of cover as these claimants are slower to RTW. The primary focus is often on the very large sum assureds and the claims with smaller financial values are overlooked.
Exclusion clauses	The correct premium needs to be collected on policies with exclusions as evidence shows that these individuals are unhealthy and are more likely to claim more often.
Claimant education	Insurers should consider sending out introductory educational information to claimants when a claim is lodged pertaining to work ergonomics, back protection and how to prevent a re-injury in order to facilitate RTW. Considering that many claimants are classified as overweight, sending out educational information about lifestyle changes at underwriting stage may be warranted.
Demographic information	Insurers should collect more information regarding their claimants to enable better underwriting and claims practices.
Standard rehabilitation reports	Information on pain scales, WAI's, details of treatment, prognosis and rehabilitation should be requested and obtained upfront in order to make better claims decisions and to improve case management.

5.4 STUDY LIMITATIONS

5.4.1 Lack of Information

The data collected in this study was limited to the claims and underwriting information that was available from the insurer. There is a lack of certain information in some cases such as demographic details and medical information. Information pertaining to claimant motivation in terms of RTW, as well as specific rehabilitation information such as number of sessions attended and the type of rehabilitation, would have provided more insight into the time taken for claimants to RTW. Current practices do not allow for detailed information to be collected and therefore, the collection of more detailed information forms part of the recommendations for the practice guidelines.

5.4.2 Information is Insurance Specific

The data collected is specific to the insurance company under study. The current practice is to obtain medical information in order to assess the claim; however, not all medical reports are in the same format and therefore the information obtained is specific to each independent claim and does not adhere to a specific standard.

5.4.3 Pain Scales

In the data available, detailed information about claimants' pain scales and WAI's were unavailable. The symptoms of pain have both psychological and physiological implications (Stites, 2013). Due to these implications, pain would have been a good measure to look at. As suggested in the practice guidelines, insurers should consider drawing up standard reports for rehabilitation providers and doctors to complete, which should contain specific information in order to ensure more effective claims assessment and management.

5.4.4 Psychosocial Factors

This study relied on the claims and underwriting data available in the sample of claims. Detailed information relating to socio-demographics and psychosocial factors was unavailable. Therefore, the extent of how socio-demographics and psychosocial factors impact the time taken for claimants to RTW is out of the scope of this research. In the study by Yong-Seok et al., (2015), psychosocial factors play a role in work absence. Claimants that display catastrophic behaviour and fear avoidance beliefs may also have

delayed recovery (Wertli et al., 2014) and insurers should be aware of this. These factors therefore need to be considered in intervention programmes to assist RTW.

5.4.5 Identification of Partial Return to Work

A reduction in an income claim payment does not always indicate partial RTW. The reduction could be due to overinsurance or the claimant not being able to prove an increased income in which case the benefit would be reduced. Therefore, it was not possible to deduce if the reduction in the monthly income benefit was solely due to a partial RTW or if it was due to alternative factors.

5.4.6 Sample Size

The sample size undertaken in this research was not large enough to deduce conclusions based on specific aspects of rehabilitation and demographic details. Additional research is required for more definitive recommendations. The sample size is however large enough to draw initial study conclusions.

5.5 STRENGTHS OF THE STUDY

This is a real world study and the data used is from actual insurance claims. The majority of studies regarding RTW have taken place in Australia, the United Kingdom and the United States but this study is the first of its kind in the Republic of South Africa. Sampling errors such as biases in the selection process have been avoided as the whole sample available was considered. The information collected was from the time of application as well as the time of the claims. By using information that was collected in the past, the information was reliable as it did not need to be recalled. The sample is large enough to deduce the initial study conclusions.

5.6 RECOMMENDATIONS FOR FURTHER RESEARCH

From this study, it can be deduced that further research is necessary to further the field of study. The following is recommended:

- To explore how RTW is affected by insurance and claims handling procedures, specifically claims requirements and claims management
- To assess the effect of an educational intervention in increasing RTW
- To assess factors affecting RTW in non-MSK conditions
- To assess the effect of case management in improving time taken to RTW
- To assess the effect of a rehabilitation intervention in improving time taken to RTW
- To assess RTW using inability to work as an outcome measure

CHAPTER 6

6. CONCLUSION

6.1 SUMMARY

Disability as a result of MSK conditions is common (Madan and Grime, 2015). The majority of MSK claims in this study originated from lower back pain and lower limb and ankle conditions. Policies with one and three months waiting periods and claimants with secondary/matric education showed delays in RTW. Claimants that were paid a gross monthly income of between R5 000 and R10 000 were faster to RTW.

Recommendations to assist insurance companies, based on the current data are presented. This could help by assisting actuaries with their estimates, assumptions or predictions regarding policy premium rates and to change insurance underwriting practices for new business. Furthermore, it provides guidelines for claims departments with regards to when intervention is necessary. This study was useful, original and the results of this study are important for insurance companies to consider in order to streamline underwriting and claims practices.

CHAPTER 7

7. REFERENCES

Ajidahun, A.T. and Phillips, J. (2013) Prevalence of musculoskeletal disorders among instrumental musicians at a center for performing arts in South Africa. *Medical Problems of Performing Artists.* 28(2). p.96.

Aldana, S.G., Merrill, R.M., Price, K., Hardy, A. and Hager, R. (2005) Financial impact of a comprehensive multisite workplace health promotion program. *Preventative Medicine.* 40(2). p.131-137.

Andersen, L.L., Fallentin, N., Thorsen, S.V. and Holtermann, A. (2015) Physical workload and risk of long-term sickness absence in the general working population and among blue-collar workers: prospective cohort study with register follow-up. *Occupational and Environmental Medicine.* [Online] Available from: http://oem.bmj.com/content/early/2016/01/06/oemed-2015-103314.abstract#content-block. [Accessed 6th March 2016].

Andersen, L.N., Juul-Kristensen, B., Sorensen, T.L., Herborg, L.G., Roessler, K.K. and Sogaard, K. (2015) Efficacy of tailored physical activity or chronic pain self-management programme on return to work for sick-listed citizens: a 3-month randomised controlled trial. *Scandinavian Journal of Public Health.* 43(7). p.694-703.

Arnetz, B.B., Sjogren, B., Rydehn, B. and Meisel, R. (2003) Early workplace intervention for employees with musculoskeletal-related absenteeism: a prospective controlled intervention study. *Journal of Occupational and Environmental Medicine.* 45(5). p.499-506.

Australasian Faculty of Occupational and Environmental Medicine of the Royal Australasian College of Physicians. (2009) *Health benefits of work*. [Online] Available from: https://www.racp.edu.au/advocacy/health-benefits-of-work. [Accessed: 23rd February 2015].

Badley, E.M. and Ibanez, D. (1994) Socioeconomic risk factors and musculoskeletal disability. *The Journal of Rheumatology.* 21(3). p.515-522.

Bakker, R.H., Bronsema, J., Brouwer, S., Dijkstra, G.J., Haselager, J.J.G. and Groothoff, J.W. (2006) Disability insurance: can underwriting criteria for the self-employed be based on predictors used for disability amongst employees? *Journal of Insurance Medicine.* 38(4). p.259-270.

Balague, F., Mannion, A.F., Pellise, F. and Cedraschi, C. (2012) Non-specific low back pain. *The Lancet.* 379(9814). p.482-491.

Baril, R., Clarke, J., Friesen, M., Stock, S. and Cole, D. (2003) Management of return-to-work programs for workers with musculoskeletal disorders: a qualitative study in three Canadian provinces. *Social Science and Medicine.* 57(11). p.2101-2114.

Berecki-Gisolf, J., Clay, F.J., Collie, A. and McClure, R.J. (2012) Predictors of sustained return to work after work related injury or disease: insights from workers' compensation claims records. *Journal of Occupational Rehabilitation*. 22(3). p.283-291.

Berman, M., Crane, R., Seiber, E. and Munur, M. (2014) Estimating the cost of a smoking employee. *Tobacco Control.* 23(5). p.428-433.

Bevan, S. (2015) Economic impact of musculoskeletal disorders (MSD's) on work in Europe. *Best Practice and Research Clinical Rheumatology.* 29(3). p.356-373.

Beveridge, M. and Howard, A. (2004) The burden of orthopaedic disease in developing countries. *The Journal of Bone and Joint Surgery*. 86(8). p.1819-1822.

Bhattacharya, R., Biswas, G. and Bhattacharya, A. (2013) Risk factors of upper limb musculoskeletal disorders of computer users: a preliminary report. *International Journal of Electronics and Communication Technology.* 4(1). p.143-145.

Biernat, E. (2015) Factors increasing the risk of inactivity among administrative, technical, and manual workers in Warszawa public institutions. *International Journal of Occupational Medicine and Environmental Health.* 28(2). p.283-294.

Bowman, B., Stevens, G., Seedat, M. and Snyman, R. (2010) Costing injuries in South Africa: preliminary results and challenges from a pilot study. *African Journal of Health Sciences.* 17(3 and 4). p.57-63.

Briand, C., Durand, M.J., St-Arnaud, L. and Corbiere, M. (2007) Work and mental health: learning from return-to-work rehabilitation programs designed for workers with musculoskeletal disorders*. International Journal of Law and Psychiatry*. 30(4). p.444-457.

Buchbinder, R., Blyth, F.M., March, L.M., Brooks, P., Woolf, A.D. and Hoy, D.G. (2013) Placing the global burden of low back pain in context. *Best Practice and Research Clinical Rheumatology.* 27(5). p.575-589.

Bultmann, U., Franche, R.L., Hogg-Johnson, S., Cote, P., Lee, H., Severin, C., Vidmar, M. and Carnide, N. (2007) Health status, work limitations, and return-to-work trajectories in injured workers with musculoskeletal disorders. *Quality of Life Research*. 16(7). p.1167-1178.

Bultmann, U., Sherson, D., Olsen, J., Hansen, C.L., Lund, T. and Kilsgaard, J. (2009) Coordinated and tailored work rehabilitation: a randomized controlled trial with economic evaluation undertaken with workers on sick leave due to musculoskeletal disorders. *Journal of Occupational Rehabilitation.* 19(1). p.81-93.

Bunn, W.B., Baver, R.S., Ehni, T.K., Stowers, A.D., Taylor, D.D., Holloway, A.M., Duong, D., Pikelny, D.B. and Sotolongo, D. (2006) Impact of a musculoskeletal disability management program on medical costs and productivity in a large manufacturing company. *The American Journal of Managed Care*. 12(1). p.27-32.

Cheng, A.S.K. and Hung, L.K. (2007) Randomized controlled trial of workplace-based rehabilitation for work-related rotator cuff disorder. *Journal of Occupational Rehabilitation.* 17(3). p.487-503.

Codsi, M. and Howe, C.R. (2015) Shoulder conditions: diagnosis and treatment guideline. *Physical Medicine and Rehabilitation Clinics of North America.* 26(3). p.467-489.

Cohen, S. (2015) Epidemiology, diagnosis and treatment of neck pain. *Mayo Clinic Proceedings.* 90(2). p.284-299.

Collins, R.M., Janse Van Rensburg, D.C. and Patricios, J.S. (2011) Common work-related musculoskeletal strains and injuries. *South African Family Practice.* 53(3). p.240-246.

Copes, W.S., Sacco, W.J., Champion, H.R., Bain, L.W., Gann, D.S., Mackenzie, E., Schwaitzberg, S. and Gennarelli, T. (1989) *Progress in Characterising Anatomic Injury*. In Proceedings of the 33rd Annual Meeting of the Association for the Advancement of Automotive Medicine. Baltimore, MA, USA. p.205-218.

Cornell University. (2009) *Definition of appointment (work status)*. [Online] Available from: https://www.hr.cornell.edu/policies/nonacademic/work_status.html. [Accessed: 27th November 2015].

Coronado, R.A., Simon, C.B., Valencia, C. and George, S.Z. (2014) Experimental pain responses support peripheral and central sensitization in patients with unilateral shoulder pain. *The Clinical Journal of Pain.* 30(2). p.1-20.

Dachs, R., Roche, S., Vrettos, B., MacIntyre, K., Currin, B., Kruger, N., Walters, J. and Dunn, R. (2014) Assessing musculoskeletal training in South Africa. *South African Orthopaedic Journal*. 13(3). p.57-63.

Darlow, B., Fullen, B.M., Dean, S., Hurley, D.A., Baxter, G.D. and Dowell, A. (2012) The association between health care professional attitudes and beliefs, clinical management, and outcomes of patients with low back pain: a systematic review. *European Journal of Pain.* 16(1). p.3-17.

Das, B. and Ghosh, T. (2010) Assessment of ergonomical and occupational health related problems among VDT workers of West Bengal, India. *Asian Journal of Medical Sciences.* 1(2). p.26-31.

Demyttenaere, K., Bruffaerts, R., Lee, S., Posada-Villa, J., Kovess, V., Angermeyer, M.C., Levinson, D., de Girolamo, G., Nakane, H., Mneimneh, Z., Lara, C., de Graaf, R., Scott, K.M., Gureje, O., Stein, D.J., Haro, J.M., Bromet, E.J., Kessler, R.C., Alonso, J. and Von Korff, M. (2007) Mental disorders among persons with chronic back or neck pain: results from the World Mental Health Surveys. *Pain.* 129(3). p.332-342.

De Zwart, B.C.H., Frings-Dresen, M.H.W. and Van Duivenbooden, J.C. (2002) Test-retest reliability of the work ability index questionnaire. *Occupational Medicine.* 52(4). p.177-181.

Dionne, C.E., Bourbonnais, R., Fremont, P., Rossignol, M., Stock, S.R. and Larocque, I. (2005) A clinical return-to-work rule for patients with back pain. *Canadian Medical Association Journal.* 172(12). p.1559-1567.

Doherty, C., Delahunt, E., Caulfield, B., Hertel, J., Ryan, J. and Bleakley, C. (2014) The incidence and prevalence of ankle sprain injury: a systematic review and meta-analysis of prospective epidemiological studies. *Sports Medicine.* 44(1). p.123-140.

Durand, M.J. and Loisel, P. (2001) Therapeutic return to work: rehabilitation in the workplace. *Work.* 17(1). p.57-63.

Eshoj, P., Jepsen, J.R. and Nielsen, C.V. (2001) Long-term sickness absence-risk indicators among occupationally active residents of a Danish county. *Occupational Medicine.* 51(5). p.347-353.

Esmaeilzadeh, S., Ozcan, E. and Capan, N. (2014) Effects of ergonomic intervention on work-related upper extremity musculoskeletal disorders among computer workers: a randomized controlled trial. *International Archives of Occupational and Environmental Health.* 87(1). p.73-83.

Gagnon, C.M., Stanos, S.P., van der Ende, G., Rader, L.R. and Harden, R.N. (2013) Treatment outcomes for workers compensation patients in a US-based interdisciplinary pain management program. *Pain Practice.* 13(4). p.282-288.

Grete, A. and Jensen, C. (2013) A two-year follow-up on a program theory of return to work intervention. *Work.* 44(2). p.165-175.

Gross, D.P., Battie, M.C. and Cassidy, J.D. (2004) The prognostic value of functional capacity evaluation in patients with chronic low back pain: part 1: timely return to work. *Spine.* 29(8). p.914-919.

Gross, D.P. and Battie, M.C. (2005) Functional capacity evaluation performance does not predict sustained return to work in claimants with chronic back pain. *Journal of Occupational Rehabilitation.* 15(3). p.285-294.

Gruber, J. (1996) *Disability insurance benefits and labour supply*. [Online] p.1-41. Available from: http://www.nber.org/papers/w5866. [Accessed: 3rd July 2014].

Guo, H.R., Tanaka, S., Halperin, W.E. and Cameron, L.L. (1999) Back pain prevalence in US industry and estimates of lost workdays. *American Journal of Public Health.* 89(7). p.1029-1035.

Hagberg, M., Violante, F.S., Bonfiglioli, R., Descatha, A., Gold, J., Evanoff, B. and Sluiter, J.K. (2012) Prevention of musculoskeletal disorders in workers: classification and health surveillance-statements of the Scientific Committee on Musculoskeletal Disorders of the International Commission on Occupational Health. *BioMed Central Musculoskeletal Disorders.* 13(1). p.109.

Hamer, H., Gandhi, R., Wong, S. and Mahomed, N.N. (2013) Predicting return to work following treatment of chronic pain disorder. *Occupational Medicine.* 63(4). p.253-259.

Hamilton, W.T. and Hall, G.H. (2003) Risk factors for ill health insurance claims. *Journal of Insurance Medicine.* 35(1). p.17-25.

Haukka, E., Martimo, K.P., Kivekas, T., Horppu, R., Lallukka, T., Solovieva, S., Shiri, R., Pehkonen, I., Takala, E.P., MacEachen, E. and Viikari-Juntura, E. (2015) Efficacy of temporary work modifications on disability related to musculoskeletal pain or depressive symptoms-study protocol for a controlled trial. *British Medical Journal Open.* 5(5). p.1-10.

Heikkila, K., Nyberg, S.T., Fransson, E.I., Alfredsson, L., De Bacquer, D., Bjorner, J.B., Bonenfant, S., Borritz, M., Burr, H., Clays, E., Casini, A., Dragano, N., Erbel, R., Geuskens, G.A., Goldberg, M., Hooftman, W.E., Houtman, I.L., Joensuu, M., Jockel, K.H., Kittel, F., Knutsson, A., Koskenvuo, M., Koskinen, A., Kouvonen, A., Leineweber, C., Lunau, T., Madsen, I.E.H., Magnusson Hanson, L.L., Marmot, M,G., Nielsen, M.L., Nordin, M., Pentti, J., Salo, P., Rugulies, R., Steptoe, A., Siegrist, J., Suominen, S., Vahtera, J., Virtanen, M., Vaananen, A., Westerholm, P., Westerlund, H., Zins, M., Theorell, T., Hamer, M., Ferrie, J.E., Singh-Manoux, A., Batty, G.D. and Kivimaki, M. (2012) Job strain and tobacco smoking: an individual-participant data meta-analysis of 166 130 adults in 15 European studies. *PLoS One.* 7(7). p.1-7.

Hildebrandt, V.H., Bongers, P.M., Dul, J., Van Dijk, F.J.H. and Kemper, H.C.G. (2000) The relationship between leisure time, physical activities and musculoskeletal symptoms and disability in worker populations. *International Archives of Occupational and Environmental Health.* 73(8). p.507-518.

Hiller, C.E., Nightingale, E.J., Raymond, J., Kilbreath, S.L., Burns, J., Black, D.A. and Refshauge, K.M. (2012) Prevalence and impact of chronic musculoskeletal ankle disorders in the community. *Archives of Physical Medicine and Rehabilitation.* 93(10). p.1801-1807.

Hoefsmit, N., Houkes, I. and Nijhuis, F.J. (2012) Intervention characteristics that facilitate return to work after sickness absence: a systematic literature review. *Journal of Occupational Rehabilitation.* 22(4). p.462-477.

Hosseinpoor, A.R., Stewart Williams, J.A., Gautam, J., Posarac, A., Officer, A., Verdes, E., Kostanjsek, N. and Chatterji, S. (2013) Socioeconomic inequality in disability among adults: a multicountry study using the World Health Survey. *American Journal of Public Health.* 103(7). p.1278-1286.

Hoy, D., Geere, J.A., Davatchi, F., Meggitt, B. and Barrero, L.H. (2014) A time for action: opportunities for preventing the growing burden and disability from musculoskeletal conditions in low- and middle-income countries. *Best Practice and Research Clinical Rheumatology.* 28(3). p.377-393.

Hoy, D., March, L., Brooks, P., Blyth, F., Woolf, A., Bain, C., Williams, G., Smith, E., Vos, T., Barendregt, J., Murray, C., Burstein, R. and Buchbinder, R. (2014) The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Annals of the Rheumatic Diseases.* [Online] Available from: http://ard.bmj.com/. [Accessed: 6th March 2016].

Hunter, D. and Silverstein, B. (2014) Perceptions of risk from workers in high risk industries with work related musculoskeletal disorders. *Work*. 49(4). p.689-703.

Itz, C.J., Geurts, J.W., Kleef, M.V. and Nelemans, P. (2013) Clinical course of non-specific low back pain: a systematic review of prospective cohort studies set in primary care. *European Journal of Pain.* 17(1). p.5-15.

Jensen, A.G.C. (2013) A two-year follow-up on a program theory of return to work intervention. *Work.* 44(2). p.165-175.

Johnson, D. and Fry, T. (2002) *Factors affecting return to work after injury: a study for the Victorian WorkCover authority*. [Online] p.1-63. Available from: https://minerva-access.unimelb.edu.au/handle/11343/33726. [Accessed: 24th November 2015].

Karpman, R.R. (2001) Musculoskeletal disease in the United States: who provides the care? *Clinical Orthopaedics and Related Research.* 385. p.52-56.

Kostol, A.R. and Mogstad, M. (2013) How financial incentives induce disability insurance recipients to return to work. *The American Economic Review.* 104(2). p.624-655.

Kraus, V.B., Worrell, T.W., Renner, J.B., Coleman, R.E. and Pieper, C.F. (2013) High prevalence of contralateral ankle abnormalities in association with knee osteoarthritis and malalignment. *Osteoarthritis and Cartilage.* 21(11). p.1693-1699.

Krause, N., Dasinger, L.K., Deegan, L.J., Brand, R.J. and Rudolph, L. (1999) Alternative approaches for measuring duration of work disability after low back injury based on administrative workers' compensation data. *American Journal of Industrial Medicine.* 35(6). p.604-618.

Krause, N., Dasinger, L.K. and Neuhauser, F. (1998) Modified work and return to work: a review of the literature. *Journal of Occupational Rehabilitation*. 8(2). p.113-139.

Krause, N., Frank, J.W., Dasinger, L.K., Sullivan, T.J. and Sinclair, S.J. (2001) Determinants of duration of disability and return-to-work after work-related injury and illness: challenges for future research. *American Journal of Industrial Medicine*. 40(4). p.464-484.

Laisne, F., Lecomte, C. and Corbiere, M. (2013) Biopsychosocial determinants of work outcomes of workers with occupational injuries receiving compensation: a prospective study. *Work.* 44(2). p.117-132.

Leino, P. and Magni, G. (1993) Depressive and distress symptoms as predictors of low back pain, neck-shoulder pain, and other musculoskeletal morbidity: a 10-year follow-up of metal industry employees. *Pain.* 53(1). p.89-94.

Liebman, J.B. (2015) Understanding the increase in disability insurance benefit receipt in the United States. *The Journal of Economic Perspectives.* 29(2). p.123-150.

Life + Health Insurance News. (2014) *Claims managers at heart of return to work: Suncorp.* [Online] Available from: http://www.lifehealthinsurancenews.com.au/local/claims-managers-at-heart-of-return-to-work-suncorp. [Accessed 6th July 2015].

Life + Health Insurance News. (2014) *Early intervention trial pays off: AIA.* [Online] Available from: http://www.lifehealthinsurancenews.com.au/local/early-intervention-trial-pays-off-aia. [Accessed 23rd February 2015].

Lin, E.L. (2012) *Back pain visual analogue scale.* [Online] Available from: http://www.ericlinmd.com/back-vas-form.php. [Accessed: 24th November 2015].

Lindberg, P., Vingard, E., Josephson, M. and Alfredsson, L. (2005) Retaining the ability to work – associated factors at work. *The European Journal of Public Health.* 16(5). p.470-475.

Lockwood, P.W., Luu, J., McGuire, B., Skaria, J. and Walsh, R. (2015) *Back in the saddle: a systematic review of occupational therapy interventions that facilitate return-to-work* (Thesis). [Online] Available from: http://scholar.google.co.za/scholar. [Accessed: 6th March 2016].

Louw, Q.A., Morris, L.D. and Grimmer-Somers, K. (2007) The prevalence of low back pain in Africa: a systematic review. *BioMed Central Musculoskeletal Disorders.* 8(105). p.1.

Macdonald, A.S. (1997) How will improved forecasts of individual lifetimes affect underwriting? *Philosophical Transactions of the Royal Society of London B: Biological Sciences.* 352(1357). p.1067-1075.

Mackenzie, E.J., Morris Jr, J.A., Jurkovich, G.J., Yasui, Y., Cushing, B.M., Burgess, A.R., DeLateur, B.J., McAndrew, M.P. and Swiontkowski, M.F. (1998) Return to work following injury: the role of economic, social, and job-related factors. *American Journal of Public Health*. 88(11). p.1630-1637.

Madan, I. and Grime, P.R. (2015) The management of musculoskeletal disorders in the workplace. *Best Practice and Research Clinical Rheumatology.* 29(3). p.345-355.

Maestas, N., Mullen, K.J. and Strand, A. (2013) Does disability insurance receipt discourage work? Using examiner assignment to estimate causal effects of SSDI receipt. *The American Economic Review.* 103(5). p.1797-1829.

Manchikanti, L., Singh, V., Falco, F.J.E., Benyamin, R.M. and Hirsch, J.A. (2014) Epidemiology of low back pain in adults. *Neuromodulation: Technology at the Neural Interface.* 17(S2). p.3-10.

Marhold, C., Linton, S.J. and Melin, L. (2002) Identification of obstacles for chronic pain patients to return to work: evaluation of a questionnaire. *Journal of Occupational Rehabilitation.* 12(2). p.65-75.

McCluskey, S., Brooks, J., King, N. and Burton, A.K. (2014) Are the treatment expectations of 'significant others' psychosocial obstacles to work participation for those with persistent low back pain? *Work.* 48(3). p.391-398.

McGeary, D.D., Mayer, T.G., Gatchel, R.J., Anagnostis, C. and Proctor, T.J. (2003) Gender-related differences in treatment outcomes for patients with musculoskeletal disorders. *The Spine Journal.* 3(3). p.197-203.

Melhorn, J.M. (2001) Impairment and disability evaluations: understanding the process. *The Journal of Bone and Joint Surgery*. 83(12). p.1905-1911.

Melhorn, J.M., Lazarovic, J. and Roehl, W.K. (2005) Do we have a disability epidemic? In: Shultz, I.Z. and Gatchel, R.J. (eds.). *Handbook of complex occupational disability claims*. United States: Springer.

Melloh, M., Elfering, A., Stanton, T.R., Kaser, A., Salathe, C.R., Barz, T., Roder, C. and Theis, J.C. (2013) Who is likely to develop persistent low back pain? A longitudinal analysis of prognostic occupational factors. *Work*. 46(3). p.297-311.

Miranda, H., Kaila-Kangas, L., Heliovaara, M., Leino-Arjas, P., Haukka, E., Liira, J. and Viikari-Juntura, E. (2010) Musculoskeletal pain at multiple sites and its effects on work ability in a general working population. *Occupational and Environmental Medicine*. 67(7). p.449-455.

Musviba, N. (2014) *Taxation of income protection policies*. [Online] Available from: http://www.sataxguide.co.za/taxation-of-income-protection-policies/. [Accessed 23rd February 2015].

National Institutes of Health (NIH) Medicine Plus. (2011) *Chronic pain: symptoms, diagnosis and treatment*. [Online] Available from: https://www.nlm.nih.gov/medlineplus/magazine/issues/spring11/articles/spring11pg5-6.html. [Accessed: 27th November 2015].

Niverthi, M. and Ianovic, B. (2001) Body mass index and mortality in an insured population. *Journal of Insurance Medicine.* 33(4). p.321-328.

Noone, P. (2012) Keeping Folk in Work for Longer. *Occupational Medicine*. 62(7). p.587.

Oyeflaten, I., Lie, S.A., Ihlebaek, C.M. and Eriksen, H.R. (2014) Prognostic factors for return to work, sickness benefits, and transitions between these states: a 4-year follow-up after work-related rehabilitation. *Journal of Occupational Rehabilitation.* 24(2). p.199-212.

Oyeflaten, I., Opsahl, J., Eriksen, H.R., Braathen, T.N., Lie, S.A., Brage, S., Ihlebaek, C.M. and Breivik, K. (2016) Subjective health complaints, functional ability, fear avoidance beliefs, and days on sickness benefits after work rehabilitation – a mediation model. *BioMed Central Musculoskeletal Disorders.* 17(1). p.1.

Palmer, K.T., Syddall, H., Cooper, C. and Coggon, D. (2003) Smoking and musculoskeletal disorders: findings from a British national survey. *Annals of the Rheumatic Diseases.* 62(1). p.33-36.

Paquette, S. (2008) Return to work with chronic low back pain: using an evidence-based approach along with the occupational therapy framework. *Work.* 31(1). p.63-71.

Parsons, D. (2014) *Job displacement insurance: an overview*. [Online] Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2450414. [Accessed 6th March 2016].

Pearmain, D. (2000) *The medical schemes act.* [Online] Available from: http://www.healthlink.org.za. [Accessed 13th March 2016].

Peduzzi, P., Concato, J., Kemper, E., Holford, T.R. and Feinstein, A.R. (1996) A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology.* 49(12). p.1373-1379.

Prinz, C. and Tompson, W. (2009) Sickness and disability benefit programmes: what is driving policy convergence? *International Social Security Review.* 62(4). p.41-61.

Puckree, T. (2009) Musculoskeletal pain in hairdressers – a study in Durban. *Journal of Community and Health Sciences.* 4(2). p.45-51.

Punnett, L. and Wegman, D.H. (2004) Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *Journal of Electromyography and Kinesiology*. 14(1). p.13-23.

Quittan, M. (2002) Management of back pain. *Disability and Rehabilitation.* 24(8). p.423 434.

Randhawa, K., Cote, P., Gross, D.P., Wong, J.J., Yu, H., Sutton, D., Southerst, D., Varatharajan, S., Mior, S., Stupar, M., Shearer, H.M., Lindsay, G.M., Jacobs, C. and Taylor-Vaisey, A. (2015) The effectiveness of structured patient education for the management of musculoskeletal disorders and injuries of the extremities: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. *The Journal of the Canadian Chiropractic Association.* 59(4). p.349-362.

Rantonen, J., Karppinen, J., Vehtari, A., Luoto, S., Viikari-Juntura, E., Hupli, M., Malmivaara, A. and Taimela, S. (2016) Cost-effectiveness of providing patients with information on managing mild low-back symptoms in an occupational health setting. *BioMed Central Public Health.* 16(1). p.1-13.

Reinsurance Group of America (RGA). (2014) *RGA Australia review.* [Online] Available from: http://www.rgare.com. [Accessed 23rd February 2015].

Reinsurance Group of America (RGA) Global Surveys. (2012) *Speciality rehabilitation services and disability insurance: a global analysis of utilization and value.* [Online] Available from: http://www.rgare.com. [Accessed 23rd February 2015].

Riihimaki, H. (2014) *Musculoskeletal Disorders. Handbook of Epidemiology.* 2nd Ed. New York: Springer New York.

Roh, H., Lee, D. and Kim, Y. (2014) Prevalence of work-related musculoskeletal symptoms and their associations with job stress in female caregivers living in South Korea. *Journal of Physical Therapy Science.* 26(5). p.665-669.

Roman-Liu, D. (2014) Comparison of concepts in easy-to-use methods for MSD risk assessment. *Applied Ergonomics.* 45(3). p.420-427.

Rondinelli, R.D. (2009) *American Medical Association guides to the evaluation of permanent impairment*. American Medical Association.

Rudy, T.E., Lieber, S.J., Boston, J.R., Gourley, L.M. and Baysal, E. (2003) Psychosocial predictors of physical performance in disabled individuals with chronic pain. *The Clinical Journal of Pain.* 19(1). p.18-30.

Ruseckaite, R. and Collie, A. (2011) Repeat workers' compensation claims: risk factors, costs and work disability. *BioMed Central Public Health.* 11(492). p.1-8.

Ryan, C.G., Lauchlan, D., Rooney, L., Hollins, Martins C. and Gray, H. (2014) Returning to work after long term sickness absence due to low back pain – the struggle within: a qualitative study of the patient's experience. *Work.* 49(3). p.433-444.

Saastamoinen, P., Leino-Arjas, P., Laaksonen, M. and Lahelma, E. (2005) Socio-economic differences in the prevalence of acute, chronic and disabling chronic pain among ageing employees. *Pain.* 114(3). p.364-371.

Schiphorst Preuper, H.R., Reneman, M.F., Boonstra, A.M., Dijkstra, P.U., Versteegen, G.J., Geertzen, J.H.B. and Brouwer, S. (2008) Relationship between psychological factors and performance-based and self-reported disability in chronic low back pain. *European Spine Journal.* 17(11). p.1448-1456.

Schultz, I.Z., Crook, J.M., Berkowitz, J., Meloche, G.R., Prkachin, K.M. and Chlebak, C.M. (2013) Early intervention with compensated lower back-injured workers at risk for work disability: fixed versus flexible approach. *Psychological Injury and Law.* 6(3). p.258-276.

Sears, J.M., Blanar, L., Bowman, S.M., Adams, D. and Silverstein, B.A. (2013) Predicting work-related disability and medical cost outcomes: estimating injury severity scores from workers' compensation data. *Journal of Occupational Rehabilitation.* 23(1). p.19-31.

Shah, N.R. and Braverman, E.R. (2012) Measuring adiposity in patients: the utility of body mass index (BMI), percent body fat, and leptin. *PLoS One.* 7(4). p.e33308.

Shaw, W.S., Main, C.J. and Johnston, V. (2011) Addressing occupational factors in the management of low back pain: implications for physical therapist practice. *Physical Therapy.* 91(5). p.777-789.

Shiels, C., Gabbay, M.B. and Ford, F.M. (2004) Patient factors associated with duration of certified sickness absence and transition to long-term incapacity. *British Journal of General Practice.* 54(499). p.86-91.

Sirge, T., Ereline, J., Kums, T., Gapeyeva, H. and Paasuke, M. (2014) Musculoskeletal symptoms, and perceived fatigue and work characteristics in supermarket cashiers. *Agronomy Research.* 12(3). p.915-924.

Sjostrom, R., Asplund, R. and Alricsson, M. (2013) Evaluation of a multidisciplinary rehabilitation program with emphasis on musculoskeletal disorders: a 5-year follow-up. *Work*. 45(2). p.175-182.

Smedley, J., Harris, E.C., Cox, V., Ntani, G. and Coggon, D. (2013) Evaluation of a case management service to reduce sickness absence. *Occupational Medicine.* 63(2). p.89-95.

Smith, D.L. (2007) The relationship of type of disability and employment status in the United States from the behaviorial risk factor surveillance system. *Journal of Rehabilitation*. 73(2). p.32-40.

Soer, R., Van der Schans, C.P., Groothoff, J.W., Geertzen, J.H.B. and Reneman, M.F. (2008) Towards consensus in operational definitions in functional capacity evaluation: a Delphi survey. *Journal of Occupational Rehabilitation.* 18(4). p.398-400.

Spavins, M.H. (2011) *Factors affecting work status of employees with chronic back pain in South Africa* (Dissertation). [Online] Available from: http://146.141.12.21/handle/10539/13749. [Accessed: 6th March 2016].

Spiegel, D.A., Gosselin, R.A., Coughlin, R.R., Joshipura, M., Browner, B.D. and Dormans, J.P. (2008). The burden of musculoskeletal injury in low and middle-income countries: challenges and opportunities. *The Journal of Bone and Joint Surgery.* 90(4). p.915-923.

Stephenson, A.M. (2016) *Return to full duty work: determining the ideal time to refer occupationally isolated acute low back pain patients to physical therapy* (Dissertation). [Online] Available from: http://scholarworks.waldenu.edu/dissertations/2383/. [Accessed: 22nd June 2016].

Stites, M. (2013) Observational pain scales in critically ill adults. *Critical Care Nurse.* 33(3). p.68-78.

Storheim, K. and Zwart, J.A. (2014) Musculoskeletal disorders and the Global Burden of Disease study. *Annals of the Rheumatic Diseases.* 73(6). p.949-950.

Straaton, K.V., Maisiak, R., Wrigley, J.M. and Fine, P.R. (1995) Musculoskeletal disability, employment and rehabilitation. *The Journal of Rheumatology*. 22(3). p.505-513.

Sundstrup, E., Jakobsen, M.D., Andersen, C.H., Jay, K., Persson, R., Aagaard, P. and Andersen, L.L. (2014) Effects of two contrasting interventions on upper limb chronic pain and disability: a randomized controlled trial. *Pain Physician*. 17(2). p.145-154.

The Free Dictionary by Farlex. (2015) *Dictionary/thesaurus: physical*. [Online] Available from: http://www.thefreedictionary.com/physical. [Accessed 27th November 2015].

The Free Dictionary by Farlex. (2015) *Dictionary/thesaurus: musculoskeletal*. [Online] Available from: http://www.thefreedictionary.com/musculoskeletal. [Accessed 15th July 2016].

The PT Companion. (2011) *Body mass index.* [Online] Available from: http://www.theptcompanion.com/bmi.html. [Accessed: 24th November 2015].

Thomas, O. (2015) *Group risk rehab returns 1,500 to work early.* [Online] Available from: http://www.covermagazine.co.uk/cover/news/2407018/group-risk-rehab-returns-1-500-to-work-early. [Accessed 6th July 2015].

Thomason, T., Burton, J.F. and Hyatt, D.E. (1998) *New approaches to disability in the workplace*. United States: Cornell University Press.

Toossi, N. and Johanson, N.A. (2016) Is BMI an independent risk factor for unfavourable outcomes following total hip arthroplasty. *The Journal of Bone and Joint Surgery.* 98(3). p.e11.

Treaster, D.E. and Burr, D. (2004) Gender differences in prevalence of upper extremity musculoskeletal disorders. *Ergonomics.* 47(5). p.495-526.

Ulug, N., Yakut, Y., Alemdaroglu, I. and Yilmaz, O. (2016) Comparison of pain, kinesiophobia and quality of life in patients with low back and neck pain. *Journal of Physical Therapy Science.* 28(2). p.665-670.

Valat, J.P., Goupille, P. and Vedere, V. (1997) Low back pain: risk factors for chronicity. *Revue du Rhumatisme (English ed*.). 64(3). p.189-194.

van der Giezen, A.M., Bouter, L.M. and Nijhuis, F.J.N. (2000) Prediction of return-to-work of low back pain patients sicklisted for 3-4 months. *Pain.* 87(3). p.285-294.

van Doorn, J.W.C. (1995) Low back disability among self-employed dentists, veterinarians, physicians and physical therapists in The Netherlands. *Acta Orthopaedica Scandinavica Supplementum.* 66*(*263). p.3-64.

Vassilaki, M. and Hurwitz, E.L. (2014) Insights in public health: perspectives on pain in the low back and neck: global burden, epidemiology, and management. *Hawaii Journal of Medicine and Public Health.* 73(4). p.122-126.

Vlaeyen, J.W.S., Kole-Snijders, A.M.J., Boeren, R.G.B. and van Eek, H. (1995) Fear of movement/(re)injury in chronic low back pain and its relation to behavioural performance. *Pain.* 62(3). p.363-372.

Vlasveld, M.C., Van der Feltz-Cornelis, C.M., Bultmann, U., Beekman, A.T.F., van Mechelen, W., Hoedeman, R. and Anema, J.R. (2012) Predicting return to work in workers with all-cause sickness absence greater than 4 weeks: a prospective cohort study. *Journal of Occupational Rehabilitation.* 22(1). p.118-126.

Wahlin, C., Ekberg, K., Persson, J., Bernfort, L. and Oberg, B. (2012) Association between clinical and work-related interventions and return-to-work for patients with musculoskeletal or mental disorders. *Journal of Rehabilitation Medicine.* 44(4). p.355-362.

Wahlin, C., Ekberg, K., Persson, J., Bernfort, L. and Oberg, B. (2013) Evaluation of self-reported work ability and usefulness of interventions among sick-listed patients. *Journal of Occupational Rehabilitation*. 23(1). p.32-43.

Walker, B.F. (2000) The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. *Journal of Spinal Disorders and Techniques*. 13(3). p.205-217.

Wand, H. and Ramjee, G. (2013) High prevalence of obesity among women who enrolled in HIV prevention trials in KwaZulu-Natal, South Africa: healthy diet and life style messages should be integrated into HIV prevention programs. *BioMed Central Public Health.* 13(159). p.1.

Wasiak, R., Verma, S., Pransky, G. and Webster, B. (2004) Risk factors for recurrent episodes of care and work disability: case of low back pain. *Journal of Occupational and Environmental Medicine.* 46(1) p.68-76.

Wells, L. and Barrett, P. (2013) *Disability income what can we learn from other markets? (A warning from history).* [Online] Available from: http://www.africanagenda.com/convention2013registration/papers/42-7f37a2a80234424 2b0059 edb114ef263.pdf. [Accessed 13th March 2016].

Weng, S.F., Ali, S. and Leonardi-Bee, J. (2013) Smoking and absence from work: systematic review and meta-analysis of occupational studies. *Addiction.* 108(2). p.307-319.

Wertli, M.M., Eugster, R., Held, U., Steurer, J., Kofmehl, R. and Weiser, S. (2014) Catastrophizing-a prognostic factor for outcome in patients with low back pain: a systematic review. *The Spine Journal.* 14(11). p.2639-2657.

Wertli, M.M., Held, U., Campello, M. and Weiner, S.S. (2016) Obesity is associated with more disability at presentation and after treatment in low back pain but not in neck pain: findings from the OIOC registry. *BioMed Central Musculoskeletal Disorders.* 17 (1). p.1-14.

Wertli, M.M., Rasmussen-Barr, E., Weiser, S., Bachmann, L.M. and Brunner, F. (2014) The role of fear avoidance beliefs as a prognostic factor for outcome in patients with nonspecific low back pain: a systematic review. *The Spine Journal.* 14(5). p.816-836.

White, M., Wagner, S., Schultz, I.Z., Murray, E., Bradley, S.M., Hsu, V., McGuire, L. and Schulz, W. (2013) Modifiable workplace risk factors contributing to workplace absence across health conditions: a stakeholder-centered best-evidence synthesis of systematic reviews. *Work*. 45(4). p.1-12.

Wind, H., Samoocha, D., van der Beek, A.J. and Frings-Dresen, M.H. (2014) Prevention of disability: the opinion of claimants applying for a disability benefit. *Work*. 49(2). p.335-341.

Winterbottom, L. (2015) *Rethinking rehabilitation: an Australian perspective.* RGA Global Claims Views. [Online] Available from: http://www.rgare.com. [Accessed 6th March 2016].

Woolf, A.D., Erwin, J. and March, L. (2012) The need to address the burden of musculoskeletal conditions. *Best practice and Research Clinical Rheumatology.* 26(2). p.183-224.

Woolf, A.D. and Pfleger, B. (2003) Burden of major musculoskeletal conditions. *Bulletin of the World Health Organization*. 81(9). p.646-656.

World Health Organization. (2015) *Disabilities.* [Online] Available from: http://www.who.int/topics/disabilities/en/. [Accessed: 27th November 2015].

Wynne-Jones, G., Cowen, J., Jordan, J.L., Uthman, O., Main, C.J., Glozier, N. and van der Windt, D. (2014) Absence from work and return to work in people with back pain: a systematic review and meta-analysis. *Occupational and Environmental Medicine.* 71(6). p.448-456.

Xinming, L., Fan, G., Abudan, A., Sukkarieh, M., Inyang, M., Gul, M., El-Rich, M. and Al-Hussein, M. (2015) Ergonomics and physical demand analysis in a construction manufacturing facility. *5th International/11th Construction Specialty Conference.*

Yong-Seok, H.E.O., Jong-Han, L.E.E.M., Shin-Goo, P.A.R.K., Dal-Young, J.U.N.G. and Hwan-Cheol, K.I.M. (2015) Job stress as a risk factor for absences among manual workers: a 12-month follow-up study. *Industrial Health.* 53(6). p.542-552.

Young, A.E., Wasiak, R., Roessler, R.T., McPherson, K.M., Anema, J.R. and van Poppel, M.N.M. (2005) Return-to-work outcomes following work disability: stakeholder motivations, interests and concerns. *Journal of Occupational Rehabilitation.* 15(4). p.543-556.

Yu, H., Cote, P., Southerst, D., Wong, J.J., Varatharajan, S., Shearer, H.M., Gross, D.P., van der Velde, G.M., Carroll, L. J., Mior, S.A., Ameis, A., Jacobs, C.L. and Taylor-Vaisey, A. (2014) Does structured patient education improve recovery and clinical outcomes of patients with neck pain? A systematic review from the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. *The Spine Journal.* [Online] Available from: http://www.sciencedirect.com. [Accessed: 16th March 2016].

Zungu, L.I. (2009) Self-reported musculoskeletal disorders among office workers in a private hospital in South Africa: prevalence and relation to physical demands of the work. *Occupational Health Southern Africa*. p.25-30.

APPENDIX A

- **DATA COLLECTION SHEET**

The following datasheet shows the factors that will be looked at to determine their effect on income disability insurance claimants returning to work following musculoskeletal injuries. Where applicable, the appropriate option will be ticked.

Claim Code	
Benefit Claimed	Income disability
Policy commencement date	
Waiting period on policy	
Age of claimant at time of claim	Years
Date of birth	DD/MM/YYYY

Gender			
Male		Female	

Race											
Black		White		Indian		Coloured		Asian		Other	

Geographical Area							
Eastern Cape		Free state		Gauteng		KwaZulu-Natal	
North West		Northern Cape		Mpumalanga		Limpopo	

Education							
Total number of years of formal education							
Highest level of education attended							
No school attended		Primary		Secondary		Matric	
Professional/technical training				University			

Marital Status							
Single		Widowed		Married/cohabiting		Separated/divorced	
Number of dependents							

Gross Monthly Income

Less than R5 000	
R5 000 – R10 000	
R10 001 to R15 000	
R15 001 to R30 000	
R30 001 to R45 000	
More than R45 000	

Gross Monthly Income Claim Payment

Less than R5 000	
R5 000 – R10 000	
R10 001 to R15 000	
R15 001 to R30 000	
R30 001 to R45 000	
More than R45 000	

Smoker Status			
Smoker		Non-smoker	

Height	Metres	
Weight at Underwriting	Kilograms	
Body Mass Index	kg/m²	
Exclusions at Underwriting	**Y**	**N**
Specific Exclusions		

Occupation					
Which one of the following best describes the occupational status at underwriting stage?					
Housework		Skilled manual labor		Managerial/professional/ technical	
Student		Unskilled manual work		Clerical support/services/sales	
Other					

Length with current employer		Months		Years

Occupation					
Which one of the following best describes the occupational status at claims stage?					
Housework		Skilled manual labor		Managerial/professional/ technical	
Student		Unskilled manual work		Clerical support/services/sales	
Other					

Length with current employer		Months		Years

Self-employed individual		Salaried individual	

How long has the claimant been in this occupation?							
Less than 5 years		5 – 10 years		>10 to 20 years		Greater than 20 years	

Return to Work

Date the claimant stopped work	DD/MM/YYYY
Date the claimant returned to work	DD/MM/YYYY
Time taken to return to work	Days

Current claim status		
Full return to work	**Partial return to work**	**Did not return to work**
In progress	**Partial and then full return to work**	

Final claim status		
Full return to work	**Partial return to work**	**Did not return to work**
In progress	**Partial and then full return to work**	

Reason for cessation of payment	

Detail of additional claims/insurance benefits			
None		Detail	

Disability

Anatomical Region					
Head or neck		Shoulder		Elbow, wrist or forearm	
Thoracic region or chest		Lumbar region		Hip	
Knee		Lower limb or ankle			
Previous history of the same injury?				Y	N
Previous surgery on the same region?				Y	N
Mechanism of injury					
Trauma		MVA		Sports injury	
Insidious onset		Unknown		Other	
Injury details					
Work related		Not work-related		Unknown	

Diagnosis		Y	N
If yes, provide detail:			
Diagnosis Made By			
Specialist/Surgeon		General practitioner		Nurse	
Physiotherapist		Occupational therapist		Other	
Severity					
Minor		Moderate		Serious	
Severe		Critical		Survivable	
Date of Diagnosis	DD/MM/YYYY				
Length of Injury (Date of Diagnosis to Return to Work)					
Special Investigations Done					
MRI		CT Scan		None	
ECG		EMG			
Other		X-ray			

Treatment

Has the claimant had treatment for this injury?	Y	N

Type of Treatment					
Injection		Minimally invasive surgery		Invasive surgery	
Other					
Provide detail:					

Rehabilitation

Has the claimant had rehabilitation?	Y	N

Type of Rehabilitation					
Physiotherapy		Occupational therapy		Psychotherapy	
General practitioner		Work rehabilitation		Nurse	
Biokineticist		Other			

If they had rehabilitation, how long after the injury did this take place?					
< 1 Week		1 to 4 weeks		>1 to 3 months	
6 Months to 1 Year		>1 year			

Rehabilitation Protocol					
Manipulation		Mobilisation		Therapeutic modalities	
Exercise therapy		Functional rehabilitation		Education	
Exercise class		Other			

Number of Sessions			
1 - 4 Sessions		>4 – 8 Sessions	
>8 - 16 Sessions		> 16 Sessions	

Length of Rehabilitation			
1 - 4 Weeks		>4 – 8 Weeks	
>8 - 16 Weeks		> 16 Weeks	

SECONDARY INJURIES

Disability

Anatomical Region					
Head or neck		Shoulder		Elbow, wrist or forearm	
Thoracic region or chest		Lumbar region		Hip	
Knee		Lower limb or ankle			
Previous history of the same injury?				Y	N
Previous surgery on the same region?				Y	N
Mechanism of injury					
Trauma		MVA		Sports injury	
Insidious onset		Unknown		Other	
Injury details					
Work related		Not work-related		Unknown	
Diagnosis				Y	N
If yes, provide detail					
Diagnosis Made By					
Specialist/Surgeon		General practitioner		Nurse	
Physiotherapist		Occupational therapist		Other	

Self-reported pain intensity scale (1 = no pain and 10= severe pain)									
1	2	3	4	5	6	7	8	9	10

Severity					
Minor		Moderate		Serious	
Severe		Critical		Survivable	
Date of Diagnosis			DD/MM/YYYY		
Length of Injury (Date of Diagnosis to Return to Work)					
Special Investigations Done					
MRI		CT Scan		None	
ECG		EMG			
Other		X-ray			

Treatment

Has the claimant had treatment for this injury?	Y	N

Type of Treatment			
Injection		Minimally invasive surgery	
Other		Invasive surgery	
Provide Details:			

Rehabilitation

Has the claimant had rehabilitation?	Y	N

Type of Rehabilitation					
Physiotherapy		Occupational therapy		Psychotherapy	
General practitioner		Work rehabilitation		Nurse	
Biokineticist		Other			

If they had rehabilitation, how long after the injury did this take place?					
< 1 week		1 to 4 weeks		>1 to 3 months	
6 months to 1 year		>1 year			

Rehabilitation Protocol					
Manipulation		Mobilisation		Therapeutic modalities	
Exercise therapy		Functional rehabilitation		Education	
Exercise class		Other			

Number of Sessions			
1 - 4 Sessions		>4 – 8 Sessions	
>8 - 16 Sessions		> 16 Sessions	

Length of Rehabilitation			
1 - 4 Weeks		>4 – 8 Weeks	
>8 - 16 Weeks		> 16 Weeks	

COMORBIDITIES

Condition					
Diabetes, thyroid disease or any other endocrinological condition		Respiratory tract infection		Any type of malignancy/cancer	
Infection		Cardiac disease		Epilepsy	
Mental illness		HIV/AIDS		Respiratory disease	
Any other medical/surgical condition requiring treatment/referral		Kidney disease			
Detail					
Diagnosis					
Date of diagnosis	DD/MM/YYYY				
Severity					
Minor		Moderate		Serious	
Severe		Critical		Survivable	

Is the claimant currently on medication (at time of claim)?	Y	N

Name of Medication					
Indication					
NSAID		Analgesic		Tranquilizers	
Muscle relaxant		Anticholinesterases		Neuromuscular drugs	
Anti-depressant		Sleep		Other	
Dosage			mg	/day	

APPENDIX B

- **LETTERS OF CONSENT**

APPENDIX

Appendix "B"

08 April 2014

To whom it may concern

I hereby confirm that permission has been granted to Leeat Blatt to anonymously use Liberty's data to conduct her research study towards her Master of Science degree at the University of the Witwatersrand.

Yours sincerely

Manager

APPENDIX

Appendix "B"

11 April 2014

To whom it may concern

I hereby confirm that permission has been granted to Leeat Blatt to anonymously use Liberty's data to conduct her research study towards her Master of Science degree at the University of the Witwatersrand.

Yours sincerely

Managing Director

APPENDIX C

- **ETHICAL CLEARANCE CERTIFICATE**

R14/49 Mrs Leeat Blatt

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140612

NAME: (Principal Investigator)	Mrs Leeat Blatt
DEPARTMENT:	Centre for Exercise and Sport Medicine Liberty Claims Department, Braamfontein
PROJECT TITLE:	Factors Influencing Return to Work Following Musculoskeletal Injuries in Income Disability Insurance Claimants
DATE CONSIDERED:	27/06/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Estelle Watson
APPROVED BY:	Professor P Cleaton-Jones, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	25/07/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**

Principal Investigator Signature

Date 01 OCTOBER 2014

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX D

- **UNIVARIATE COX PROPORTIONAL HAZARD REGRESSION ASSESSING FACTORS ASSOCIATED WITH RETURN TO WORK**

Variable	Category	P-value	Hazard Ratio	95% Hazard Ratio Confidence Limits	
Previous Claims	No		1.00	Reference	
	Yes	0.83	1.06	0.64	1.74
Waiting Period on Policy	7 days backdated		1.00	Reference	
	1 month	**<0.01**	0.48	0.34	0.68
	3 months	**<0.01**	0.17	0.09	0.34
Age of Claimant at Time of First MSK Claim/Event	20 – 30	0.42	1.21	0.76	1.91
	31 – 40	0.81	1.04	0.74	1.47
	41 – 50		1.00	Reference	
	51 – 60	0.28	0.78	0.50	1.23
Gender	Male		1.00	Reference	
	Female	0.93	1.02	0.71	1.44
Highest Level of Education Attended	Secondary/Matric	**0.01**	0.65	0.47	0.89
	Professional/Technical Training	**<0.01**	0.48	0.30	0.79
	University		1.00	Reference	
Gross Monthly Income Sum Assured	Up to R10 000	0.47	1.21	0.72	2.05
	R10 001 to R 15 000	0.86	0.96	0.61	1.51
	R15 001 to R30 000		1.00	Reference	
	R30 001 to R45 000	0.52	0.87	0.57	1.34
	More than R45 000	**0.04**	1.54	1.03	2.31
Gross Monthly Income Claim Payment	Less than R5 000	**0.13**	1.56	0.87	2.80
	R5 000 to R10 000	**<0.01**	2.21	1.41	3.46
	R10 001 to R15 000	**0.08**	1.46	0.95	2.23
	R15 001 to R30 000		1.00	Reference	
	R30 001 to R45 000	0.74	1.08	0.68	1.71
	More than R45 000	0.38	1.27	0.75	2.14
Smoker Status at Time of First Underwriting	Non-Smoker		1.00	Reference	
	Smoker	0.75	0.95	0.68	1.32
BMI (kg/m^2) at Initial Underwriting	18.5 - 24.9 (Normal)		1.00	Reference	
	25.0 - 29.9 (Overweight)	0.38	0.86	0.61	1.21
	30.0 - 34.9 (Grade 1 Obesity)	0.34	0.79	0.48	1.28
	35.0 - 39.9 (Grade 2 Obesity)	0.46	1.29	0.65	2.54
Occupation at Underwriting	Managerial/Professional/Technical		1.00	Reference	
	Clerical Support/Services/Sales	0.59	1.17	0.66	2.07
	Skilled Manual Labour	**<0.01**	0.46	0.29	0.73

Variable	Category	P-value	Hazard Ratio	95% Hazard Ratio Confidence Limits	
Length in Occupation at Time of Underwriting	0 - ≤5 years		1.00	Reference	
	>5 - ≤10 years	**0.13**	1.37	0.91	2.05
	>10 - ≤15 years	**0.19**	1.36	0.86	2.16
	>15 - ≤20 years	0.66	0.88	0.50	1.55
	>20 years	0.31	0.76	0.45	1.29
Occupation at Claim	Managerial/Professional/Technical		1.00	Reference	
	Clerical Support/Services/Sales	0.69	1.13	0.63	2.04
	Skilled Manual Labour	**<0.02**	0.48	0.30	0.76
Length with Current Employer (Days) at Time of MSK Claim	0 - ≤5 years		1.00	Reference	
	>5 - ≤10 years	0.33	0.82	0.55	1.23
	>10 - ≤15 years	0.88	0.97	0.65	1.45
	>15 - ≤20 years	0.82	0.94	0.56	1.58
	>20 years	0.50	0.83	0.48	1.42
Type of Employment	Salaried Individual		1.00	Reference	
	Self-Employed Individual	0.69	0.94	0.69	1.27
How Long in Occupation at Time of MSK Claim?	≤5 Years	0.54	0.84	0.48	1.46
	>5 to ≤10 Years	0.67	0.92	0.63	1.35
	>10 to ≤20 Years		1.00	Reference	
	>20 Years	**0.07**	0.70	0.47	1.03
Anatomical Region	Lumbar Region		1.00	Reference	
	Elbow/Wrist or Forearm	0.49	0.81	0.45	1.47
	Head or Neck	0.84	1.06	0.63	1.76
	Lower Limb or Ankle	**0.09**	1.42	0.95	2.11
	Shoulder	0.35	1.22	0.80	1.86
Previous History of the Same Injury	No		1.00	Reference	
	Yes	0.63	1.14	0.68	1.90
Mechanism of Injury	Insidious Onset		1.00	Reference	
	MVA	0.96	1.01	0.58	1.79
	Sports Injury	**0.08**	1.72	0.94	3.16
	Trauma	0.72	1.07	0.75	1.52
Injury Details	Not Work-related		1.00	Reference	
	Work-related	0.73	1.12	0.60	2.06
Type of Treatment	Surgery		1.00	Reference	
	Other	**0.08**	0.72	0.50	1.04
Has Claimant had Rehabilitation?	Yes		1.00	Reference	
	No	0.54	0.84	0.48	1.48
Amount of Rehabilitation	1 healthcare provider		1.00	Reference	
	2 or > healthcare providers	0.30	0.78	0.48	1.25

Variable	Category	P-value	Hazard Ratio	95% Hazard Ratio Confidence Limits	
Secondary Injuries Anatomical Region	None		1.00	Reference	
	Any	0.59	0.87	0.52	1.46
Taking Medication for MSK	Yes		1.00	Reference	
	No	0.68	1.10	0.69	1.76
Categorised Medication	Analgesia		1.00	Reference	
	Analgesia and NSAID	**0.08**	0.66	0.42	1.05
	NSAID	0.37	0.77	0.43	1.36
	None	0.62	0.88	0.54	1.45

APPENDIX E

- **DECLARATION OF PLAGIARISM**

Faculty of Health Sciences, Postgraduate Office
Philip V Tobias Building, 2nd Floor
Cnr York & Princess of Wales Terrace, Parktown 2193
Tel: (011) 717 2745 | Fax: (011) 717 2119
Email: Mathoto.senamela@wits.ac.za

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I LEEAT BLATT (Student number: 1003063) am a student registered for the degree of MSc (MED) SPORTS AND EXERCISE SCIENCE in the academic year 2016.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: LBlatt. Date: 18/03/2016

APPENDIX F

- **TURN-IT-IN REPORT**

FullDissertationTurnitin.doc

ORIGINALITY REPORT

8%	5%	6%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.market-web.co.za Internet Source	1%
2	Shaw, William S. Main, Chris J. Johnston. "Addressing occupational factors in the management of low back pain: implications for physical therap", Physical Therapy, May 2011 Issue Publication	1%
3	www.iwh.on.ca Internet Source	<1%
4	J. Mark Melhorn. "Do We Have a Disability Epidemic?", Handbook of Complex Occupational Disability Claims, 2005 Publication	<1%
5	Handbooks in Health Work and Disability, 2014. Publication	<1%
6	Handbooks in Health Work and Disability, 2016. Publication	<1%
7	Submitted to University of Witwatersrand	